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NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

**MISSION ACCOMPLISHED! OR NOT?
A STUDY ABOUT SUCCESS IN INFORMATION OPERATIONS**

by

Thomas Lamke

September 2012

Thesis Co-Advisors: Edward Fisher
Steven Iatrou

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13. ABSTRACT

This study has analyzed success in information operations: what it is and how it is determined. The research was carried out as a literature study and is limited to encompassing the military part of information operations. The main sources have been U.S., British and Swedish information operations doctrines. Success in information operations is discussed from two perspectives: the evaluative and the predictive. According to doctrines, success from an evaluative perspective is determined by measuring post-action effects on the target.

It is problematic to determine success from the predictive perspective. This conclusion is based on the lack of analytical tools and/or processes to determine the effort needed, and the current lack of procedures to coherently connect operational objectives with tactical tasks in the information environment. In order to pursue this beyond the initial results of the thesis, success in the maritime domain is briefly analyzed and the outcome of the analysis is adjusted and applied to the information environment. Several areas are presented where the adjusted concept of operations could benefit the information environment; the most significant improvement would be the ability to predict probability of success prior to an operation. Lastly, directions for further studies are presented.

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MISSION ACCOMPLISHED! OR NOT?
A STUDY ABOUT SUCCESS IN INFORMATION OPERATIONS

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Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN INFORMATION WARFARE
SYSTEMS ENGINEERING

from the

NAVAL POSTGRADUATE SCHOOL
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LIST OF ACRONYMS AND ABBREVIATIONS

DIME	Diplomatic Information Military Economic
CNO	Computer Network Operations
EBAO	Effects Based Approach to Operations
EW	Electronic Warfare
ISAF	International Security Assistance Force
JP	Joint Publication
KFOR	Kosovo Forces
MCAD	Military Civil Advisory Division (KFOR, Kosovo)
MMI	Man Machine Interface
MOE	Measurements of Effectiveness
MOP	Measurements of Performance
PPI	Plan Position Indicator
PSYOP	Psychological Operations
RADAR	RAdio Detection And Ranging
UN	United Nations
XO	Executive Officer

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I. INTRODUCTION

In “classic” kinetic warfare, success can be measured with help from statistics and empirical knowledge, e.g., if 20 rounds of small arms ammunition are fired towards a prone soldier at least one will hit based on previous experiences. Success can also be measured by analyzing changes on a battlefield map. When a hill or a town falls in the hands of one side, the map will be redrawn and success can quite easily be measured by using a ruler. Eventually the government of a state can determine the need to surrender just by analyzing the map. There are more ways to measure success, but they all have one thing in common: the methods are largely quantitative.

These facts facilitate the possibility to accurately, and in a timely fashion, determine progress toward the desired end state, i.e., the actual change of physical and/or cognitive situation in comparison with the desired change. The ability to measure outcome is a central process in military planning because without knowing which of the changes a related action has created, it is almost impossible to understand if the actions were successful or a failure; it is almost as impossible to create a good understanding about the next step in an operation. You have to understand where you are in order to know where you should go next to achieve your goals. The two aspects of success, the evaluation after an event has occurred and the necessity to be able to calculate and predict with a degree of probability how you must behave in order to succeed, will be discussed in depth in Chapter IV.

The outcome of an information operation often does not provide direct quantitatively measurable answers for an evaluation. In most cases, changes in the information environment cannot be measured in the same fashion as with kinetic actions in warfare. The present thesis will address this difference in the discussion about how success is determined in information operations.

The visible spectrum, or any other spectrum, used in information operations cannot be captured or incorporated within a state´s borders, and it holds no nationality. But, at the same time, information operations has a lethal ingredient, both from direct physical destruction of communication components and indirectly because of the change of behavior in an opposing force due to the effects of an information operation. This duality regarding non-lethal and lethal components in information operations uniquely differentiates this environment in comparison to the traditional combat domains.

Based on the uniqueness of the characteristics, the theory around information operations differs from the traditional combat domains and this has led to the development of a separate set of planning guidance and procedures military actions within the information environment.

Despite the unique elements in its nature, an information operation is seldom an isolated act of warfare. Instead, it is carried out in conjunction with other efforts in order to be able to achieve the desired end state. As is common with these other efforts, we must ask how are the criteria for success determined, i.e., how are end state objectives in the information operations environment reached? Is it possible to merge different staff procedures together so that the outcome is understandable, usable and compatible within these procedures and with the procedures in other war fighting areas? Warfare produces several windows of opportunity, but they all exist for a limited period and the opportunities must be exploited without hesitation to be able to take advantage of favorable situations. There is simply not enough time available to deal with interpretation issues between two planning methods.

This thesis will try to answer the fundamental question of what is success in information operations; furthermore, it will examine if it could be beneficial to use a traditional combat domain’s basic ideas in order to better understand and interpret the term success when conducting and evaluating information operations.

II. PROBLEM STATEMENT AND RESEARCH METHOD

A. RESEARCH QUESTIONS

In 2009, the author was stationed in Pristina, Kosovo, assigned as the Executive Officer (XO) for the Military Civilian Advisory Division (MCAD) in KFOR headquarters. During this assignment, the KFOR headquarters introduced effects based approach to operations (EBAO), a method to measure the effects actions have on a society, instead of measuring explicitly the outcome of military actions as is done in traditional planning. MCAD recruits, organizes and trains the Kosovo Security Force (KSF), established in 2008, as a part of the Kosovo status settlement.[1] The author participated with MCAD in different events to introduce and establish the new staff method. One of the issues that were especially intriguing was the question of how to measure progress in operations other than war, as the MCAD's focus was to reach initial operational capability as soon as possible. Some areas were easier to measure. For example, the number of members successfully recruited and vetted by a certain date. Others areas were more difficult. For example, to measure how successful a firefighting unit was to conduct firefighting, which is one of the core capabilities for KSF. In the more difficult areas, quantitative performance, i.e., number of repetitions, was measured instead of the effectiveness of each unit. Evaluation was based on how many times the members had conducted a related exercise, not on how successful they were carrying out the tasks at each exercise. The results did not reflect the skills and effectiveness of the units. So why this introduction? When studying information operations literature that this author's previous questions and thoughts about measurements of effectiveness are still valid and posed a challenge when searching for answers in the literature of what success is in information operations. Similarly, this was found in the challenge to identify,

[1] United Nations Office of the Special Envoy for Kosovo, "The Comprehensive proposal for Kosovo Status Settlement," (n.d.), http://www.unosek.org/unosek/en/statusproposal.html.

observe and evaluate adequate parameters in situations where measurements cannot physically tell the difference. If the objective is obtain the unit's capacity, evaluating the internal performance is not enough. To obtain a true answer, the effect the operation has on the opposing force(s) must be included. For instance, it does not matter how much jamming an electronic warfare unit can carry out if the adversary force is operating on frequencies outside the jammer's coverage.

The question of success is somewhat overlooked in military literature. Obviously, the overarching goal when engaging in a physical conflict is victory. Otherwise, warfare would be a cynical waste of human sacrifices. Therefore, one would expect that special attention would be spent on this very basic question. Instead, most discussions about success are implied in other terms, such as aims, objectives or a desired end state. The ability to establish criteria for, and frame, success into a realistic context is crucial when determining objectives in the sense that it has to be achievable; otherwise, it can be viewed simply as dreaming.

Compared to sea, land and even air warfare, information warfare is a young discipline and, due to the nature of information, it is difficult to frame into a generally accepted definition. The information environment, however, shares some of its characteristics with the air and sea domains. All of them exist without borders. In addition, they cannot be fortified or seized more than in the abstract sense that the air above and the sea surrounding a nation belong to the nation.

The lack of clear answers and guidelines in the analyzed literature led to the topic: what is success in information operations and, furthermore, how is it determined? One thing that became apparent at the start of research is the complexity the subject offers. The world of today is dependent on a seamless information flow and this opens up the possibility to exploit the information environment for various unethical and criminal actions. In this broad perspective, information operations affect all parts of a society and, if trying to encompass and analyze such a broad target, it gets complex and even problematic to contextualize or understand. For this subject, it can also be argued that this

complexity is a problem in itself. The term *friction* is used in traditional warfare to explain why a simple laid out plan encounters problems and sometimes comes to a full stop. The military theorist Clausewitz stated: “Everything in war is simple, but the simplest thing is difficult.”[2] The term friction is therefore commonly used in military planning to underline the importance of keeping a plan simple in order to enhance the possibility of success. This praxis has been applied to traditional warfare theories and is reflected in doctrines and manuals. This leads to the idea of using experience from the domains to find a different answer to the thesis; to explore if this is a feasible approach and if such an examination would improve the ability to determine success if a “doctrinal package” from a domain should be applied to the information environment. For this thesis, the domain examined and applied shall be the maritime domain.

Based on the above mentioned, the study will be focused on the primary research question:

How is success determined in information operations?

To answer this question, three related questions must also be answered:

- What is success in military operations?
- What is success in information operations?
- With regard to the environmental similarities between the maritime and the information environment, can general concepts of naval theory be adapted to determining success in information operations?

[2] Carl von Clausewitz, *On War*, trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976), 119.

B. ORGANIZATION OF THE THESIS

The study analyzes how success is determined in information operations based on literature sources selected to represent a broad theoretical foundation. The U.S., British and Swedish information operation doctrines are the three main pillars examined.

The first two chapters present the background, the research questions, and different aspects of framing the subject into a suitable format. Chapter III discusses several essential terms related to the research questions in order to establish a solid foundation for the thesis and to deepen the understanding for the expressions commonly used throughout the text. Chapter IV starts with a discussion about success in information operations. Thereafter, the discussion focuses on how success is determined according to the chosen literature. The thesis then discusses success in maritime operations and, lastly, the maritime concept of operation is applied to the information environment. Chapter V summarizes the findings of this study and suggests areas of future research.

C. RESEARCH METHOD

The research is conducted as a literature study. The area of interest for the thesis is large; in order not to overlook already existing knowledge about the topic, the natural first step was to start from the beginning, i.e., to look into available sources covering information operations.

A qualitative analysis of the texts was chosen rather than a quantitative analysis. Briefly, the difference between the two methods can be described as "qualitative data involves words and quantitative data involves numbers."[3] The research was organized and conducted by analyzing and comparing multiple sources, with an emphasis on the contextual meaning of each text, not on comparing how often a looked for expression was mentioned in a text. The study

[3] Colorado State University, "*The Qualitative versus Quantitative Debate*," (n.d.), http://writing.colostate.edu/guides/research/gentrans/pop2f.cfm.

does not involve any quantitative comparative analysis between studied literatures. Therefore, a qualitative research method was chosen as it better suits the taken approach of the study and hopefully this choice has enhanced the quality of the research, and ultimately the thesis.

The findings for this method are by nature strictly theoretical and must be followed up with practical tests to validate the results. This will be discussed in Chapter V where areas for further research are suggested.

D. LIMITATIONS

Limitations will be used to frame the study with the purpose of maintaining the focus of the text and avoiding deviation from the objectives. The limitations are applied in the following areas:

- Information operations is a broad term and covers all stages of a conflict. It is a tool that can be used within all instruments of power available within part of a conflict, not only as a supporting operation for a traditional military operation.[4] Trying to embrace all situations where information operations can be applied is a task too large for a thesis. In order to make the topic manageable and narrow the area of research, the thesis is limited to cover only the part of information operations that involves the use of military forces.
- Judicial issues connected to information operations will not be covered. It is an area which, in the future, will be framed by legal and other boundaries and restrictions.[5] The conclusions will not encompass any proposed judicial restrictions.

[4] The Instruments of power are usually referred to the acronym DIME: Diplomatic, Informational, Military and Economic. For further information see, for example: Command & Staff College Distance Education Program, (AY 11) *National & International Security studies*, vol. I 2–2. DIME will also be discussed in Chapter III.

[5] Edward Halpin, Philippa Trevorrow, David Webb, Steve Wrigth, Eds., *Cyberwar, Netwar and Revolution in Military Affairs* (New York, N.Y: Palgrave Macmillan, 2006), 139–140.

- The British, Swedish and U.S. perspectives of information operations will be covered. The author of this work has no ambition to include all cultural differences affecting information operations.
- There are significant differences in resources between the three countries used in the research. This difference, however, is believed to be beneficial for the outcome of the thesis. Nation-specific text, i.e., doctrinal work, is written based on available information power resources and presents different perspectives.

E. SOURCES

Information operations can be used to shape information used by a third party or to mislead the same. Therefore, in order to be true to the subject of the thesis it is necessary to conduct a critical survey of the used sources. The purpose of this survey is to create a better understanding about the biases and weaknesses of each source. The sources can be divided into four sub-categories:

1. Doctrines and Other Defense Publications

The study is primarily based on official publications from the United States, United Kingdom and Sweden. There are several reasons for choosing publications from these three countries:

- The first is that they do not create any language problem for the author. Non-English official military publications are seldom or never translated into other languages and trying to use such sources would create severe difficulties for the author.
- Empirically, the United Kingdom and the United States have been very influential both in general warfare development as well as in information operations development.
- They are written from three different power perspectives. The United States is currently the only military superpower in the world.

The United Kingdom is a major player in the NATO alliance and has had extensive experience in conducting war. Sweden is, from the military perspective, a peripheral country. It has not been involved in a war since 1814 (the date does not include participation in international missions such as KFOR or ISAF) and is not a member of any military alliance. Together these three represent a broad perspective on doctrinal work.

2. Internet Sources

The Internet has forever changed the management and exchange of information. Humanity can share information at a speed previously impossible[6] to achieve, and the cost for a user to spread and receive information is uniquely low. All that is needed is access to an Internet connected device, a service provided free in libraries all over the world.[7] The introduction of the Internet has also changed the control of information flow. Before the Internet, there were usually several layers of filtering before information went public. Any piece of information published through the traditional information channels such as TV, radio, press or a library, were filtered through a publisher, a journalist, a TV producer or the equivalent. Today anyone can log on to the Internet and distribute unfiltered information without any requirements that the information be fact checked or validated. Additionally, applying governmental control on the Internet cannot be done without at the same time enforcing censorship. On the contrary, everybody with access to the Internet can contribute without any censorship or influence from a third party, such as an editor or a publisher. It is even possible to bypass your nation's regulations by using a server situated in a foreign country.

---

[6] United Kingdom, The Joint Doctrine & Concepts Centre, Joint Warfare Publication 3-80, *Information Operations* (Swindon: Ministry of Defence, 2002), 1-1.

[7] Douglas Browning, Michael Covington, and Melody Mauldin Covington, *Dictionary of Computer and Internet Terms,* 10th ed. (Hauppauge, NY: Barron's Educational Series, 2009), s.v. "Internet."

The unfiltered contribution is one of the main attractions but, on the other hand, it is also one of the main obstacles when searching for information on the Internet. Information is easy accessible, often by simply using one of the search engines, and they usually present search results containing more web pages than you can possibly browse through. The need to examine the webpages used in a scientific text is, therefore, even higher than for printed or broadcast media. Initially a thorough examination of the origin of the webpage is necessary. Registration and use of a domain name that sounds trustworthy or is very similar to a trustworthy page is easily accomplished. Typing www.whitehouse.org in a browser's address field will result in being directed to Ron Paul's official 2012 presidential campaign website. Typing www.whitehouse.gov[8] will result in being directed to the president of the United States. The small change of appendix to the domain name is enough to redirect the user in an unwanted direction and might be confusing.

If a web page passes the first step of evaluation and is concluded to be trustworthy, it is still necessary to examine if the information is obsolete, what the sources are, and if the actual information is altered from the original source. It is also crucial to find the reason why the information is published on the Internet and to determine the publisher's intentions.

The Internet has several components including the World Wide Web (WWW), which consists of more than 360 million websites,[9] where each has multiple web pages. Finding the information you need on a credible web page is crucial when using Internet-based resources in a study. The use of the Internet has been limited to three types of sources due to the aforementioned reasons:

- Official publications retrieved from official websites.

[8] Both of the web page examples were accessed March, 15, 2012.

[9] Howmanyarethere? "How Many websites Are There on the Internet?" June 22, 2011. http://howmanyarethere.net/how-many-websites-are-there-on-the-Internet/

- An example is The British defence doctrine where the online PDF version of the book is used.

- Online published books.
  - An example is the online Gutenberg project, which offers over 38,000 eBooks previously published by bona fide publishers. These are as authentic as the hard copy.
- Regular websites. Internet-based sources will be used restrictively and thoroughly evaluated. Only if the source is considered trustworthy will the information be used.

With all the information available on the Internet It would be inefficient and almost ignorant to not to use it. Information from the Internet must, however, be used with care and with a lot of common sense.

3. Published Material (Books, Articles)

The context for information operations is expanding and there is almost a “best before”-date on published material. Therefore, a rule of thumb has been mostly to select books that are primarily no more than ten years old for the research. This helps ensure that the latest developments in the field are covered.

An additional benefit is that the books fulfill today’s requirements regarding academic standards, including full presentation of used sources and texts that are usually footnoted.

That said, the literature list also consists of a few books older than the “best before date.” They are used because of their central position, and they still have an impact on contemporary military theory. Many of these books do not fulfill the academic requirements we expect from modern academic literature, but they all are internationally recognized as standards of work in their respective fields and are, therefore, recognized as academically solid.

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III. ANALYSIS OF THE RESEARCH QUESTION AND FRAMEWORK DISCUSSION

This chapter will discuss fundamental definitions, their origins, different views, and which definition the thesis will use. The aim of the chapter is to establish a solid base for further discussion and conclusions.

A. PURPOSE

> "All right," said Deep Thought. "The answer to the great question ..."
>
> "Is"
>
> "Forty-two," said Deep Thought, with infinite majesty and calm. ...
>
> "Forty-two!" yelled Loonquawl. "Is that all you've got to show for seven and a half million years' work?"
>
> "I checked it very thoroughly," said the computer, "and that quite definitely is the answer. I think the problem, to be quite honest with you, is that you've never actually known what the question is."[10]

Deep Thought, i.e., the name of the computer, provides an answer that highlights an important aspect: the need to actually analyze and understand the question the study revolves around. If you have read the book "*The Hitchhiker's Guide to the Galaxy,"* you should learn from Deep Thought. Analyze and understand your own posed question(s).

The problem statement contains three fundamental terms: information, information operations and success.[11] Moreover, the term operations calls for some explanation as it is used in different contexts and with different meanings in military literature, doctrines, handbooks and field manuals. These terms will be

---

[10] Douglas Adams, *The Hitchhikers Guide to the Galaxy* (London: PAN 1979), 187.

[11] See Chapter II. A. for the present thesis research question.

qualitatively analyzed with the aim to define the main research question even better and achieve a good understanding regarding the central terms of the study.

B. INFORMATION AND THE INFORMATION ENVIRONMENT

> Information is the oxygen of the modern age. It seeps through the walls topped by barbed wire, it wafts across the electrified borders.
>
> —Ronald Reagan, U.S. President 1981–1989

1. Data, Information and Knowledge

Everything around us is information. A house is a physical construction, which can be inhabited or used for other purposes, and at the same time it represents a piece of data that this is a house and it can be used for different purposes. According to Checkland and Holwell in their book, "*Information, Systems and Information Systems—Making Sense of the Field,"* the process of data transition into information occurs when: "data is transformed into information when meaning is attributed to it*."*[12] This is a human mental activity and is a prerequisite for data to be turned into useful information. Assume that an observer has seen a house (any house) prior to being confronted with information about another house. He/she can understand and relate the new information to the previous information. Due to the existing knowledge, sense can be made of the new information. There is no need to enter or even see the house to understand the new information. The information can be connected to related information and the larger information structure leads to knowledge.[13] The process in which data is turned into knowledge and understanding is shown in Figure 1.

---

[12] Peter Checkland and Sue Holwell, *Information, Systems, and Information Systems-Making Sense of the Field* (Chichester, West Sussex: John Wiley & Sons, 2004), 95.

[13] Ibid., 90.

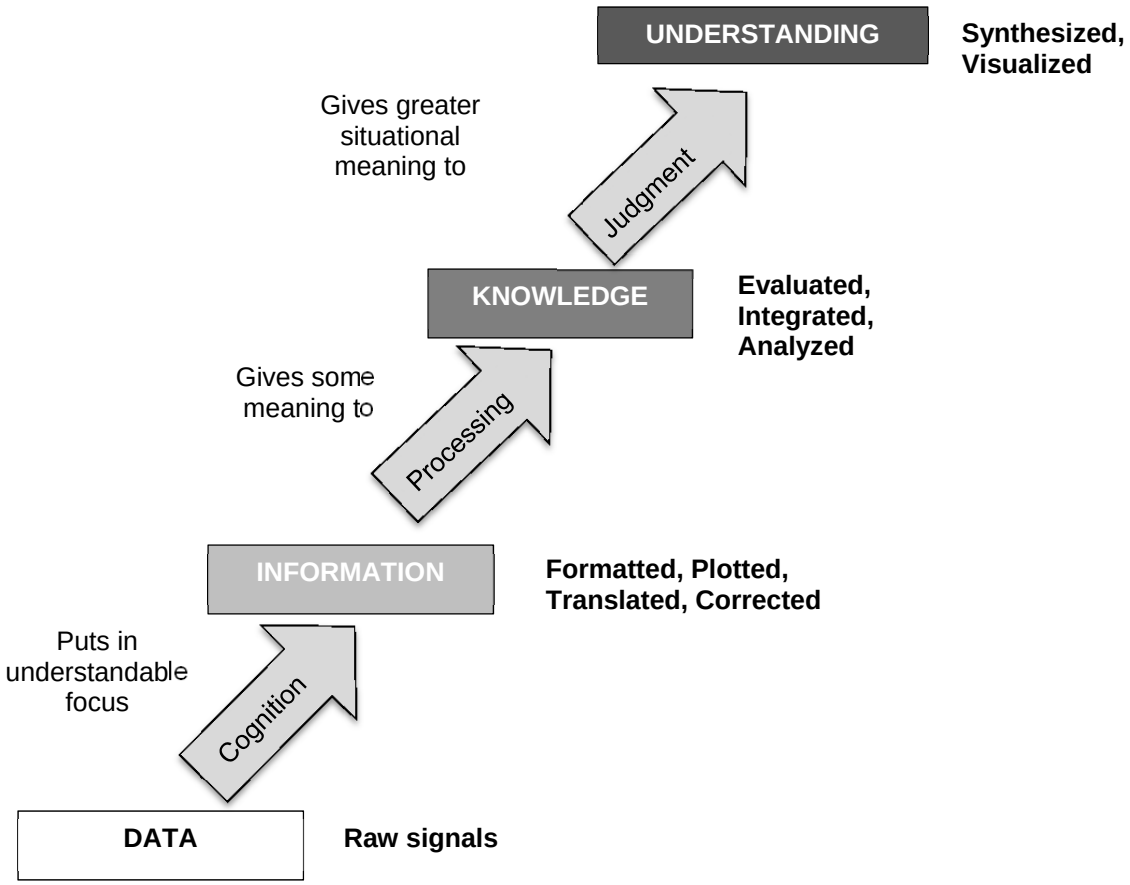

Figure 1. Information hierarchy[14]

Information technology has changed the way we can collect data and process it into information and knowledge. With the use of very sophisticated information technologies, today we can collect information about the Big Bang origin of the universe that occurred approximately 13.7 billion years ago. Moreover, modern information technologies enable the spread of information at a speed inconceivable a few years ago. Unfortunately, the technologies can also be, and have been, used to spread rumors, lies and malicious software, which

[14] From: United States, Marine Corps University, *Operational Art, Course Book & Readings 8903, Volume II, AY08* (Marine Corps University, 2008), *7-2–7-3.*

can be exploited, creating vulnerabilities that must be protected.[15] This is a very old technique (except for malicious software), but the introduction of information technologies has increased the speed with which bad information can be distributed worldwide.

In the military field, data are both collected by direct observation or via sensors and presented on a man-machine interface, e.g., a computer screen or on a radar plan position indicator. In modern warfare, staff and commanding officers seldom encounter the enemy face-to-face. They are often dependent on timely and accurate information provided by sensors and various technologies within the information environment. This situation has been prevalent in the navies and air forces of the world since the introduction of radar. Up until recent times, human interactions have been the most efficient method of information sharing for land-based operations. With the introduction of new information technologies, armies are increasingly using the information environment to support decision-making. The result is that modern commanders, especially in the higher echelons, are dependent on the information environment and technology when planning and conducting operations.[16] In the military field, information is also used to influence the will of an adversary through psychological operations (PSYOP), deception, electronic warfare (EW) and computer network operations (CNO).[17]

Information is often borderless and is seldom restricted by physical obstacles such as water or continents. Information technology has added to this borderless nature of information. For instance, you can be anywhere in the world and still have instant U.S. stock market updates. From the military perspective,

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[15] United Kingdom, The Joint Doctrine & Concepts Centre, Joint Warfare Publication 3-80, *Information Operations* (Swindon: Ministry of Defence, 2002), 1-1.

[16] Wayne, P. Hughes Jr., *Fleet Tactics, Theory and Practice* (Annapolis, MD: U.S. Naval Institute, 1986), 171.

[17] United Kingdom, The Joint Doctrine & Concepts Centre, Joint Warfare Publication 3-80, *Information Operations*, (Swindon: Ministry of Defence, 2002), 2-6.

this can be a complicating factor. An information campaign could be initiated from a country that has no part or national interest in a conflict. Groups or individuals within non-participating countries might have an influence on events between participants. It is worth mentioning that there are legal considerations that might occur when a nation responds to an information operation initiated by individuals or non-official groups within a country.[18]

2. Information Power

Joint Publication JP 3–13 "*Information Operations"* states, "**Information is a strategic resource vital to national security**. Dominance of the information environment is a reality that extends to the Armed Forces of the U.S. at all levels."[19] But, what does "strategic resource" mean? Clausewitz's studies on warfare are a good starting point to explain information power on the strategic level: "War is merely the continuation of policy by other means."[20] If the power of information distributed through one or several information operations can avoid engaging kinetic warfare and thus minimizing physical destruction, the information must be considered to have strategic importance.[21]

On an operational level, the power of information is evident through numerous historical examples. Information operations were used extensively prior to and during the D-Day invasion of France, which had the effect that German forces were misallocated and had their focus on areas other than the actual landing beaches.[22] The lack of understanding of information power was a reason why U.S. forces halted combat operations in Fallujah in April of 2004.

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[18] United States. Joint Chief of Staff, Joint Publication 3-13, "*Information Operations,"* (Washington, D.C, 2006), I-6.

[19] Ibid., I-3.

[20] Carl von Clausewitz, *On War* (Ed: Michael Howard and Peter Paret, Princeton, N.J: Princeton University Press, 1976), 87.

[21] G.J. David Jr., T.R. McKeldin III, (Ed.), *Ideas as Weapons, Influence and Perception in Modern Warfare"* (Dulles, VA: Potomac Books Inc., 2009), 116.

[22] William B. Breuer, *Hoodwinking Hitler, the Normandy Deception* (Westport, CT: Praeger Publishers, 1993), chapter 11 and 24.

> Marines won virtually every combat engagement throughout the battle and did so within the established rules of engagement. The missing element was an overall integrated information component to gain widespread support of significant influencers and to prepare key publics for the realities of the battle plan.[23]

Information is powerful enough to start and stop conflicts; it can be used to influence and change people's will, attitudes, beliefs and behavior.[24] The armed forces of today are all dependent on integrated command and control systems in order to handle large amounts of information provided by increasingly sophisticated and highly sensitive sensors. If an adversary can interfere and alter information the damage can be substantial, and as discussed earlier, be the reason why a kinetic operation succeeds or fails.[25]

3. Information Environment

The information environment is a metaphysical space that consists of a physical dimension, an informational dimension and a cognitive dimension. This space defines the boundaries for the information area of operations. The term environment is taken from the Joint Publication JP 3-13 "*Information Operations."* The other environments where war fighting takes place, sea, air, land and space are named "domains" and this change of terminology might confuse a reader when studying the different doctrines.[26] In order to be consistent, the U.S. information operation doctrine's term "environment" will be used. The components included in the information environment and how they are related to each other are presented in Table 1.

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[23] G.J. David Jr., T.R. McKeldin III, ed., *Ideas as Weapons, Influence and Perception in Modern Warfare* (Dulles, VA: Potomac Books Inc., 2009), 267.

[24] Anthony R. Pratkanis, *The Science of Social Influence, Advances and Future Progress* (New York, NY: Psychology Press, 2007), 297.

[25] Försvarsmakten, *Handbok Informationsoperationer* (Stockholm: HKV, M7739–352014, 2008), 15.

[26] United States U.S. Joint Chief of Staff, Joint Publication 3-0, *Joint Operations*, (Washington, D.C., 2011), IV-11.

THE INFORMATION ENVIRONMENT	
Physical Dimension	• Where the information environment overlaps with the physical world • Information systems and networks • Key Characteristics: computers and communication systems and supporting infrastructures
Informational Dimension	• Where information is collected, processed, disseminated, stored and protected • Dual nature – information itself and the medium • Key characteristics: information content and flow, information quality • Where the automated decision making takes place
Cognitive Dimension	• Where human decision making takes place • Dimension of intangibles. such as morale, unit cohesion, public opinion and situational awareness • Key Characteristics: perception , emotions, awareness and understanding

Table 1. The information environment[27]

4. Definition of Information

The U.S. Joint Publication JP 3–13 "*Information Operations*" defines information as:

1. Facts, data, or instructions in any medium or form

2. The meaning that a human assigns to data by means of the known conventions used in their representation[28]

The first definition relates to the bottom step in Figure 1, *Information Hierarchy*. The second part of the definition is particularly interesting as it

[27]From: United States. Joint Chief of Staff, Joint Publication 3-13, *Information Operations* (Washington, D.C., 2006), I-2.

[28] United States. Joint Chief of Staff, Joint Publication 3-13, *Information Operations* (Washington, D.C., 2006), GL-9.

recognizes the cognitive interpretation of data. There is a human factor to take into consideration when discussing information. All humans have their own set of knowledge, experience and capabilities that affect the person's interpretation of a received piece of data.

One of the cornerstones for information operations is the revolutionary capability to transfer huge amounts of data at a very high speed, a capability that is evolving continuously. This latest technological development, combined with the very traditional involvement of the cognitive dimension as soon as information is shared between two persons, are two of the main ingredients used in the information environment and information operations. Therefore, the JP 3-13 definition of information will be used as it encompasses both technology and human interactions.

C. OPERATIONS, OPERATIONAL LEVEL AND OPERATIONAL ART

Military activities exist on different levels involving different people, from the senior national leadership to the soldier or the seaman carrying out the orders that originally emanates from strategic objectives to win the war. There are three generally accepted levels of war: strategic, operational, and tactical.[29] Sometimes the strategic level is divided into two sub-levels—the grand strategic and the military strategic levels—in order to allow for a more precise discussion. Whether you accept a three or a four level definition, the strategic level is generally accepted to be the highest level of warfare.[30]

There are no strict boundaries between the levels; they offer a generalized description of activities and responsibilities at each level. Every commander must bear in mind that action on one level might have a significant impact on the other levels. Dividing into levels facilitates planning on each level to be more precise in

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29 United States U.S. Joint Chief of Staff, Joint Publication 3-0, *Joint Operations* (Washington, D.C., 2011), I-12.

30 United Kingdom, The Joint Doctrine & Concepts Centre, Joint Warfare Publication 0-01*, British Defence Doctrine* (Swindon: Ministry of Defence,2001), 1–3.

establishing desired end-states, the ways in which they are to be achieved, and the means necessary to achieve them.[31] The relationship between levels is visualized in Figure 2.

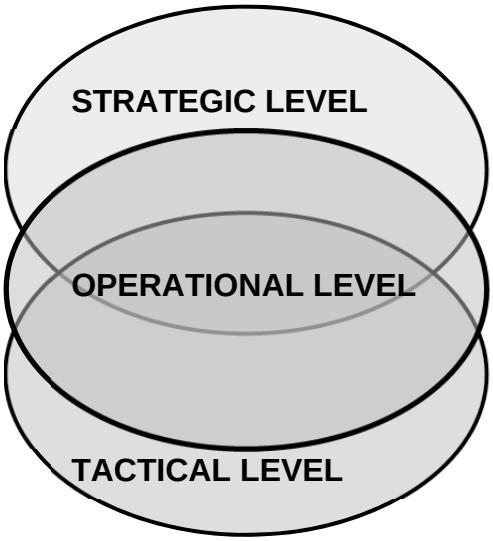

Figure 2. Levels of war[32]

1. Strategic Level

The strategic level translates the political goals to military objectives and coordinates the instruments of national power so that a state's efforts are synchronized and integrated in order to achieve theater, national, and/or multinational objectives.[33]

2. Operational Level and Operational Art

The operational level is the level in which military campaigns are designed, planned and executed. This is carried out by using operational art. i.e.,

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[31] United Kingdom, The Joint Doctrine & Concepts Centre, Joint Warfare Publication 0-01*, British Defence Doctrine* (Swindon: Ministry of Defence,2001), 1–3.

[32] From United Kingdom, The Joint Doctrine & Concepts Centre, Joint Warfare Publication 0-01*, British Defence Doctrine* (Swindon: Ministry of Defence,2001), 1–4.

[33] United States U.S. Joint Chief of Staff, Joint Publication 3-0, *Joint Operations* (Washington, D.C., 2011), I-13.

the combined skills, creativity, knowledge and experience of commanders and staff on the operational level. Strategy is translated into tactics on this level.[34]

3. Tactical Level

This is the level at which the actual fighting takes place. Tactics is the art of the organized deployment of forces for battle or direct support for the units engaged in battle in order to achieve military objectives. The objectives are translated into tasks or activities for the units.[35] The tactical level also covers non-combat activities in support of planning and operations.[36]

4. Operations

The term "operations" encompasses all actions and engagements carried out by a military unit independently on the level of war that relates to the operation. As an example, Operation "*Iraqi Freedom"* involved actions and activities on all levels of war. The term "operation" is described by the U.S. Joint Publication 3-0 "*Joint Operations"* as *"*Operations generally involve military action or the accomplishment of a strategic, operational, or tactical, service, training, or administrative military mission."[37] Note that information operations are level-less, even though most of their planning is carried out on the operational level. The actual actions are almost entirely carried out by units at the tactical level.

5. Campaign

A campaign can be described as the glue that connects the levels of war together and forms a unified effort on the operational level in order to reach the

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[34] United States U.S. Joint Chief of Staff, Joint Publication 3-0, *Joint Operations* (Washington, D.C., 2011), I-13.

[35] United Kingdom, The Joint Doctrine & Concepts Centre, Joint Warfare Publication 0-01*, British Defence Doctrine* (Swindon: Ministry of Defence, 2001), 1–3.

[36] United States U.S. Joint Chief of Staff, Joint Publication 3-0, *Joint Operations* (Washington, D.C., 2011), I-14.

[37] United States U.S. Joint Chief of Staff, Joint Publication 3-0, *Joint Operations* (Washington, D.C., 2011), I-14.

desired end-state of the campaign. According to the U.S. doctrine for "*Campaigning"* a campaign is a "series of military related operations aimed at accomplishing a strategic or operational objective within a given time and space."[38] British doctrine uses the NATO definition, which is "A set of military operations planned and conducted to achieve a strategic objective within a given time and geographical area, which normally involve maritime, land and air forces."[39] The major difference is NATO's emphasis on the combined effort in a campaign, and the NATO emphasis solely on the strategic objective.

Generally, a campaign is sequentially constructed as follows: Units engaged in the campaign carry out activities or operations whose intended consequences contribute to reach the supporting effects. One or several supporting effect(s) contributes to decisive conditions that are identified as necessary to achieve a campaign objective. The campaign end-state is reached when all of the campaign objectives have been achieved. [40]If the campaign(s) was properly planned and implemented, then the end result will be mission success.

Figure 3 shows a sequential buildup of a campaign and how the different levels of war contributes towards the strategic objectives:

[38] United States U.S. Joint Chief of Staff, Joint Publication 5-00.1, *Joint Doctrine for Campaign Planning* (Washington, D.C., 2002), GL-3.

[39] NATO, AAP-6, *NATO Glossary of Terms and Definitions, (English and French)*, (NATO standardization agency (NSA), NATO Headquarters, Brussels, 2008), 2-C-1, s.v. "Campaign"

[40] United Kingdom, The Joint Doctrine & Concepts Centre, Joint Doctrine Publication 01, Second Edition, *Campaigning* (Swindon: Ministry of Defence, 2008), 3-10.

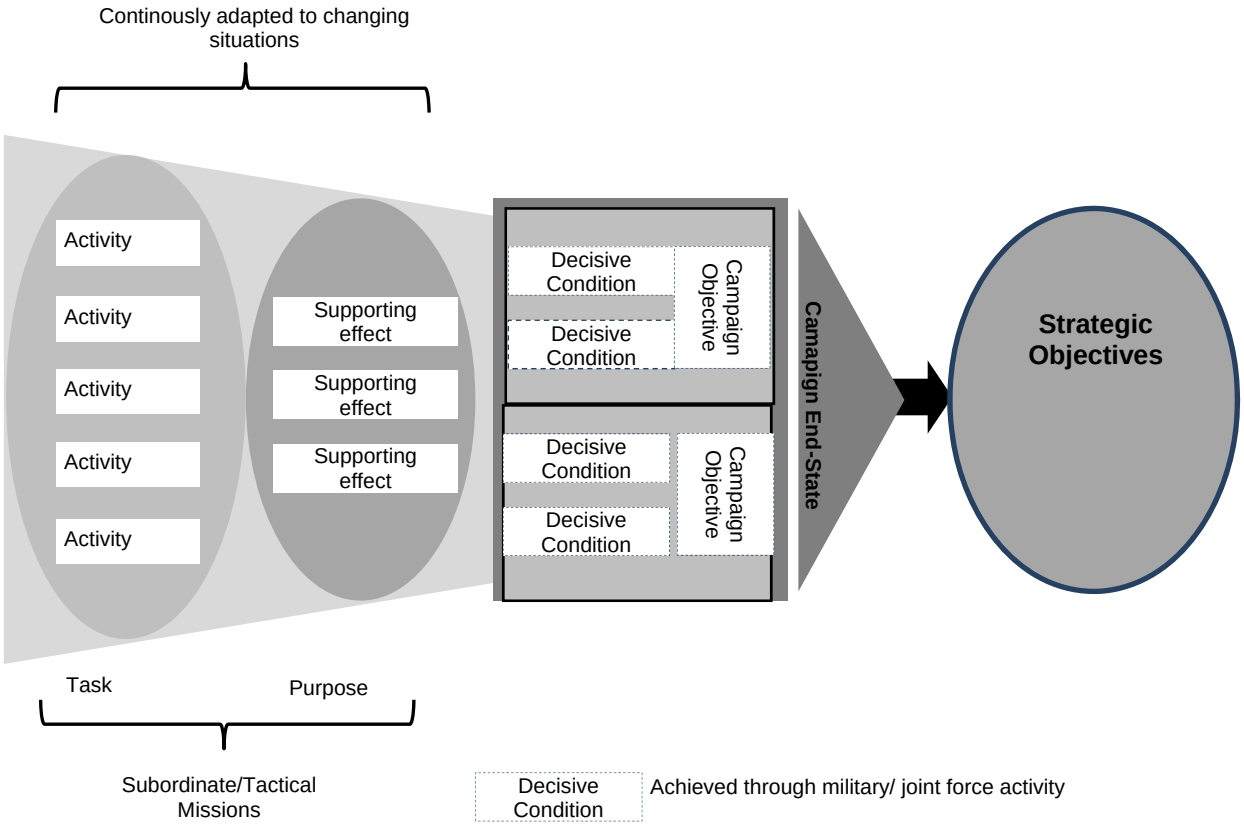

Figure 3 From activity to strategic objectives[41]

Information operations must be integrated into the campaign, from the activities on the lowest level up, as a part of the campaign end-state.[42] However, a military campaign should not be confused with an information campaign.

While similar to a military campaign, an information campaign is a combined effort within the information environment to reach mainly strategic objectives. According to the British Doctrine "*Joint Warfare Publication 3–80, Information Operations"* an information campaign attempts to "Co-ordinate output of all government activity undertaken to influence decision-makers in support of

[41] After: United Kingdom, The Joint Doctrine & Concepts Centre, Joint Doctrine Publictation 01, Second Edition, *Campaigning* (Swindon: Ministry of Defence, 2008), 3-10.

[42] United States U.S. Joint Chief of Staff, Joint Publication 5-00.1, *Joint Doctrine for Campaign Planning* (Washington, D.C., 2002) I-2.

policy objectives, while protecting one's own decision-makers."[43] U.S. Joint Publication 3–13 *"Information Operations"* does not use the term campaign to describe a series of related information operations. Instead, the U.S. doctrine uses information operations as the unified term for efforts in the information environment.[44]

According to the British doctrine, an information campaign is a cross agency effort, and a military information operation contributes to the overall objectives defined in the information campaign.[45]

The expression information campaign is also widely used in areas outside the military community, for instance when discussing the combined effort in advertisement. This aspect of the definition is not included in this study.

D. INFORMATION OPERATIONS

1. Introduction to Information Operations

All human beings use social influence to "direct, coordinate, and influence other member of the species."[46] The reason for the social influence differs. A teacher's main occupation is to share information in order to spread knowledge to the next generation. Politicians try to share their visions and goals for the nation so that voters have a good understanding about the alternatives to choose from on election day. Advertising in virtually any medium is considered perfectly legitimate even though this is an apparent attempt to influence the targeted audience to change a behavior or to induce a greater willingness to buy a product. These are just a few examples where information is used to influence

[43] United Kingdom, The Joint Doctrine & Concepts Centre, Joint Warfare Publication 3-80, *Information Operations* (Swindon: Ministry of Defence, 2002) I-2.

[44] United States. Joint Chief of Staff, Joint Publication 3-13, *Information Operations* (Washington, D.C., 2006) I-8.

[45] United Kingdom, The Joint Doctrine & Concepts Centre, Joint Warfare Publication 3-80, *Information Operations* (Swindon: Ministry of Defence, 2002) iii.

[46] Anthony R. Pratkanis, *The Science of Social Influence, Advances and Future Progress* (N.Y: Psychology Press, 2007), 17.

the receiver's cognitive domain in order to achieve a change of attitude and behavior. The military's use of social influence does not differ from the civilian use, in the sense that the will and capability of an adversary is the main focus for the efforts. However, the terminology and the concepts of social influence in a military context have been adjusted so that they fit in with the rest of the military community.

The use of information in military operations is as old as warfare itself. World War II introduced and enhanced the development of machines handling data, such as radio communications technologies, radar, and machines capable of carrying out computations for calculating projectile trajectories and code breaking.[47] This led to the "second industrial revolution," also known as the information revolution, and the beginning of the information age in the early 1960s.[48] All predictions today about the future point towards a continuation of what we see in the growth of information sharing and electronic interactions and connections with hardware that doubles its capacity every two years.[49]

Information operations are, in comparison with the other military activities, a new phenomenon. Information warfare as an aspect of contemporary warfare started to receive academic attention in the early 1980s and the area is still under development.[50] This has led to discussions of how to label the subject, especially the core term "information operations." Moreover, some literature uses the term "information warfare," seemingly with the same meaning as "information operations." Studying literature covering the subject can sometimes be confusing

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[47] Martin Van Crevled, *Technology and War, from 2000 B.C to the Present* (New York: The Free Press, 1991), 267–268.

[48] Peter Checkland and Sue Holwell, *Information, Systems, and Information Systems-Making Sense of the Field* (Chichester, West Sussex: John Wiley & Sons, 2004), 4.

[49] The hardware development pace prediction is taken from Intel's co-founder Gordon Moore and is commonly referred to as "Moore's Law."
Intel "Moore's Law Inspires Intel Innovation" (n.d.),
http://www.intel.com/content/www/us/en/silicon-innovations/moores-law-technology.html

[50] Edwin Leigh Armistead, *Information Warfare: Separating Hype From Reality* (Dulles, VA: Potomac Books, 2007), 97.

and calls for clarification to create a better understanding of the information operations framework and terminology.

2. The Purpose of Information Operations

Combat effectiveness of a military actor is a function of three pillars:[51]

- Physical factors
- Morale factors
- Conceptual factors

Physical factors consist of military units, personnel and other military resources, and will not be discussed further. Information operations aim to influence an adversary's will, which is a component of the morale factors, and capability, which is a component of the conceptual factors.

- Information operations are focused at influencing an adversary's will and aimed at weakening the desire to continue fighting, and to reinforce resolve and protect one's own forces from influence attempts.
- Information operations affects an adversary's capability to impose and apply a commander's will through their command, control communications, computer and intelligence infrastructure so that the capability or capacity to impose and bolster will is degraded, destroyed, disrupted or denied. The operation also aims to protect and reinforce one's own force capabilities so that the commander can impose and bolster his or her will without any disruption.

3. Information Operations Versus Information Warfare

The latest edition of the U.S. Joint Publication 3–13 *"Information Operations"* from 2006 removes "Information Warfare" as a term from the

[51] Försvarsmakten, *Handbok Informationsoperationer* (Stockholm: HKV, M7739–352014, 2008), 23.

doctrine.[52] It is still used, however, in publications and articles. So what is the difference and is it important to make the distinction between the two terms? It is almost impossible to give a clear uncontested and undisputed answer to the reason of why the term information warfare was abandoned. Some authors argue that information operations stretch over the entire conflict scale whereas information warfare has been a part of traditional warfare, which is the last stage of a political disagreement.[53] Another explanation is that the term warfare is, by obvious reasons, closely connected to an act of violence, which is only one part of an information operation. Leigh Armistead argues that the change was forced because the term "warfare" itself could not be accepted by non-military U.S. federal agencies involved in this new aspect of conflict. Information operations are, according to Armistead, an acceptable compromise.[54]

It could be argued that the military aspects are still warfare and that the overall definition to include non-military functions correctly used the term operations. Leigh Armistead makes the following distinction between the two terms: "Information warfare is what you use when information operations fail."[55]

The problem with compartmentalizing the different definitions is actions that include information operations carried out by military units in a non-violent conflict in the warfare definition. Alternatively, an information operation carried out by another agency clearly supporting one side is an information operation. In other words, there are non-violent aspects to military information operations, and violent aspects of non-military information related activities.

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52 United States. Joint Chief of Staff, Joint Publication 3-13, *Information Operations* (Washington, D.C., 2006) iii.

53 Edwin Leigh .Armistead, ed. *Information Operations, Warfare and the Hard Reality of Soft Power* (Washington, D.C: Brassey's Inc., 2004), 20.

54 Edwin Leigh Armistead, *Information Operations Matters: Best Practices* (Dulles, VA: Potomac Books Inc., 2010), 94.

55 Edwin Leigh Armistead, *Information Operations, Warfare and the Hard Reality of Soft Power* (Washington, D.C: Brassey's, Inc., 2004), 19.

Another source of confusion is the different definitions used in various publications. The definitions even vary between editions of the same publication: Joint Publication 3–13 "*Information Operations,"* has changed the definition between the 1998 edition and the 2006 edition as follows:

1998 IW	**1998 IO**	**1998 IO**
ELEMENTS	CAPABILITIES	RELATED ACTIVITIES
Computer Network Attack	Computer Network Attack	Public Affairs
Deception	Deception	Civil Affairs
Destruction	Destruction	
Electronic Warfare	Electronic Warfare	
Psychological Operations	Psychological Operations	

2006 IW[56]	**2006 IO**	**2006 IO**	**2006 IO**
------	CORE CAPABILITIES	SUPPORTING CAPABILITIES	RELATED ACTIVITIES
------	Computer Network Attack	Information assurance	Public Affairs
------	Deception	Physical security	Civil Military Operations
------	Electronic Warfare	Physical attack	Defense support to public
------	Psychological Operations	Counterintelligence	Diplomacy
------		Combat camera	

Table 2. JP 3–13 comparison IO definitions[57]

As mentioned before, information warfare was removed from the entire 2006 edition, and the definition of information operations does not include "destruction" as a core capability, but instead it is defined as a supporting capability. When comparing the two tables you can see that the elements included in the 1998 information warfare definition are the same as for the 2006 information operations definition except for the term physical destruction. Does this mean that the difference is simply semantic? Are the terms "warfare" and

56 United States. Joint Chief of Staff, Joint Publication 3-13, *Information Operations* (Washington, D.C., 2006) GL-9. s.v. "Information Warfare"

57 From: 2006 United States. Joint Chief of Staff, Joint Publication 3-13, *Information Operations* (Washington, D.C., 2006) I-6. And:
1998 Edition: United States. Joint Chief of Staff, Joint Publication 3-13, *Information Operations* (Washington, D.C., 1998) I-9.

"operations" interchangeable in the U.S. doctrinal sphere? The 2006 edition describes information operations as follows:

> Information operations (IO) are described as the integrated employment of Electronic Warfare (EW), Computer Network Operations (CNO), Psychological Operations (PSYOP), Military Deception (MILDEC), and Operations Security (OPSEC), in concert with specified supporting and related capabilities, to influence, disrupt, corrupt, or usurp adversarial human and automated decision-making while protecting our own.[58]

The 1998 Edition describes it as:

> Information operations (IO) involve actions taken to affect adversary information and information systems while defending one's own information and information systems. They apply across all phases of an operation, the range of military operations, and at every level of war. They are a critical factor in the Joint Force Commander's (JFC's) capability to achieve and sustain the level of information superiority required for decisive joint operations.

The same edition defines information warfare as:

> Information operations conducted during time of crisis or conflict to achieve or promote specific objectives over a specific adversary or adversaries.[59]

The 2006 Edition does not make a distinction between "non-conflict" and "conflict." Quite the contrary, it emphasizes that information operations are conducted across the entire range of a conflict and, therefore, information warfare as a terminology is obsolete.[60] The changes between editions have created a situation where several authors discussing information operations or information warfare use either term, but seem to interpret the terms interchangeably. In addition, note that the general purpose and common

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[58] United States. Joint Chief of Staff, Joint Publication 3-13, *Information Operations* (Washington, D.C., 2006) ix.

[59] United States. Joint Chief of Staff, Joint Publication 3-13, *Information Operations,* (Washington, D.C., 1998) I-11.

[60] United States. Joint Chief of Staff, Joint Publication 3-13, *Information Operations* (Washington, D.C., 2006) I-8,

denominator for information operations is not changed between the editions: to influence will and capability in order to weaken an adversary and protecting and reinforce one's own forces.[61]

To conclude the discussion: the definition of information operations lacks a generally accepted taxonomy, which has made it difficult to understand and problematic to implement alongside other military capabilities.[62]

4 Information Operations Versus I in DIME

Before armies engage in physical violence, there are other means to resolve a conflict, such as diplomatic efforts, economic sanctions and the use of information in various ways. These three entities together with military operations represent the elements of power a nation or an international organization can use to influence an adversary, and is often referred to as DIME: the diplomatic, informational, military and economic instruments of power. The informational element of national power (I in DIME) can be described as the use of information content and technology to affect the behavior of governments, organizations and societies, with a long-term perspective. The informational instrument of power must be connected to the possibility of, and the will to escalate to, violence if necessary. Otherwise, there is a risk that the communicated message might be perceived as empty words without substance. The use of the informational element of power may begin long before any actual fighting begins, and furthermore the use of information might prevent physical violence. Information power is, in a DIME perspective, not exclusively or even primarily conducted by a nation's military. That role falls to the "M" in DIME. Typically, many federal

[61] See the discussion in Chapter III:D:2. The *Purpose of Information Operations.*

[62] Edwin Leigh Armistead, *Information Operations Matters: Best Practices*, (Dulles, VA: Potomac Books Inc., 2010), 94.

agencies may engage in the use of informational power to protect national assets and to prevent conflict escalation.[63]

Military led information operations, which are a subset of the "M" in DIME rather than of the "I," are a component of all efforts a nation's military can use to influence an adversary to change their behavior, but are not the only available information related resources or capabilities.

5. Definition and Taxonomy of Information Operations

Information operations affect all parts of a society and can be conducted through multiple actions, individually or in a concerted effort through operations or a campaign. Ultimately, information operations aims to influence will and capability so that an adversary's power position is weakened while one's own is reinforced. Similar to that of offense and defense in land warfare, protection from information operations is as essential as the ability to influence an adversary. The British Doctrine "*Joint Warfare Publication 3–80, Information Operations"* defines information operations as:

> Co-ordinated actions undertaken to influence an adversary or potential adversary in support of political and military objectives by undermining his will, cohesion and decision-making ability through affecting his information, information-based processes and systems while protecting one's own decision-makers and decision-making processes.[64]

This definition, in contrast to the U.S. JP 3–13 (2006 edition), emphasizes that information operations are a part of the political and military objectives for the conflict with the aim to impede the adversary's ability to function and make correct decisions. The lack of informational core capabilities in the British definition is another significant difference between the two documents. It is also

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[63] Edwin Leigh Armistead, *Information Opertaions Matters: Best Practices* (Dulles, VA: Potomac Books Inc., 2010), 38.

[64] United Kingdom, The Joint Doctrine & Concepts Centre, Joint Warfare Publication 3-80, *Information Operations* (Swindon: Ministry of Defence, 2002), 2-1.

close to the definition the U.S. Secretary of Defense released in a January 25, 2011 memorandum, which replaces the definition in the current U.S. information operations doctrine. The new definition is as follows:

> The integrated employment, during military operations, of information-related capabilities in concert with other lines of operation to influence, disrupt, corrupt, or usurp the decision-making of adversaries and potential adversaries while protecting our own.[65]

Even though this new U.S. definition is very close to the British definition in defining information operations, the comprehensive nature of the British definition, paired with precise formulated objectives, makes it attractive and easy to apply in discussions regarding information operations. Therefore, the British definition of information operations will be used.

E. SUCCESS

> You ask, what is our aim? I can answer that, in one word: victory at all costs, victory in spite of all terror, victory however long and hard the road may be; for without victory there is no survival.
>
> —Sir Winston Churchill, House of Commons, May 1940.

Ultimately, success in an armed conflict relies upon one side realizing the war cannot be won without intolerable sacrifices, and that the will to fight is so weakened that surrender, partial or complete, is a more desirable alternative than to continue the fighting. If this threshold is not met, a ceasefire due to a claimed victory is merely a chance for the defeated party to reorganize and later reinitiate resistance against the winner.[66]

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[65] United States, Secretary of Defense, Memo, *Strategic Communication and Information Operations in the DoD* (Departement of Defense, Washington D.C., January 2011), 2.

[66] Angelo Codevilla and Paul Seabury, *War Ends & Means* (New York: Basic Books, Inc., 1989), 244.

As the term success is pivotal for the research question it must be thoroughly analyzed in order to establish a common understanding of the general meaning of what is success and, more specifically, how it is applied in an information operations perspective. To start from the very beginning, the semantic interpretation of the word success originally derives from the Latin word successus, which translates to an outcome.

It is roughly the same answer if the word is looked up in a dictionary. Here the well-renowned Collins "*English dictionary"* is used: the dictionary defines success as[67]*:*

1. The favorable outcome of something attempted.
2. The attainment of wealth, fame, etc.
3. An action, performance, etc., that is characterized by success.
4. A person or thing that is successful.
5. (Obsolete) any outcome.

The first definition from Collins is closest to the research question: success is connected to an outcome of an action or process. The dictionary describes success in general terms, and it does not contain any thresholds or any other distinguishable indicators as to what outcomes are considered favorable or not. Furthermore, the description given in the dictionary is not specifically connected to military operations. To steer the search towards the military theory field, and thus find a more adequate and accurate definition, Carl von Clausewitz's "*On War"* is used. This is probably the world's most well renowned book on military theory and it is widely used as a reference. In the first

[67] Collins Cobuild, *Advanced learners English Dictionary* (Glasgow: HarperCollins Publishers 2003) s.v: "*success.*"

book ("On War" is divided into several books instead of chapters), *"On the Nature of War"* [68] Clausewitz states that: "War is thus an act of force to compel our enemy to do our will."[69]

Note that Clausewitz's focus is at the strategic level and the term refers to the political will of a people. It should not be confused with the purpose of information operations as discussed earlier in the chapter. In the book, he argues that war is nothing but a large-scale duel and both sides strive to force the other to do their will. The quote reflects more the political reasons why a war is started, and it relates to the book's discussion about the relationship between political will and physical violence. Clausewitz argues that war starts when political actions have no impact on the adversary and, therefore, is the last solution used to solve a political argument. Later in the book Clausewitz discusses the context of the act of war and he states that the military aim in war is:

> Fighting is the central military act...Engagements mean fighting. The object of fighting is the destruction or defeat of the enemy.
>
> What do we mean by the defeat of the enemy? Simply the destruction of his forces, whether by death, injury, or any other means—either completely or enough to make him stop fighting....The complete or partial destruction of the enemy must be regarded as the sole object of all engagements....Direct annihilation of the enemy's forces must always be the dominant consideration.[70]

The focus on the destruction of the enemy is related to the fact that an army can be reorganized and continues to fight if the will and the physical capability to do so still exists in a defeated army. Historically, the level of destruction was used as a measurement to define success. The only way to establish a solid win was to exterminate the enemy. Through the way in which

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[68] Carl von Clausewitz, *On War* consists of eight (8) books and each book is divided into chapters.

[69] Carl von Clausewitz, *On War*, trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976), 3.

[70] Carl von Clausewitz, *On War*, trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976), 226–229.

war has evolved, total destruction is almost impossible, but more importantly, it is considered inhumane in contemporary warfare because the fighting units are intertwined and inseparable from the rest of the society. In what can be considered as the quintessential example of total war, Germany was eventually forced to sign an unconditional surrender in World War II after both its military and civilian populace sustained years of attacks that it was no longer able to endure.

Today, the stakes are higher if a people can accept the violent destruction of the enemy as suggested by Clausewitz, and traditional war has now been accompanied or replaced by asymmetrical operations, small wars and other operations that differ in context and execution from the type of traditional warfare that was prevalent when Clausewitz wrote his book. Therefore, it is necessary to introduce a more subtle definition of success than to destroy the enemy, in order to be able to determine whether operations were successful or not.

The intention of the following discussion is to include various aspects of a conflict that influence outcome of a war in order to find a comprehensive definition of success in contemporary warfare. The discussion will also investigate how today's conditions of conducting war is related to the classic principles of war, and if those principles still have relevance, particularly when searching for a modern comprehensive definition of success.

Figure 4. President George W. Bush onboard USS Abraham Lincoln.[71] Note the banner in the background.

On March 20, 2003, the military invasion of Iraq began. On the 1st of May 2003, former U.S. President George W. Bush was standing on the landing deck onboard the USS ABRAHAM LINCOLN against a backdrop reading: "MISSION ACCOMPLISHED" and said:

> Admiral Kelly, Captain Card, officers and sailors of the USS Abraham Lincoln, my fellow Americans: Major combat operations in Iraq have ended. In the Battle of Iraq, the United States and our allies have prevailed. Now our coalition is engaged in securing and reconstructing that country.[72]

The above quote shows how difficult it can be to determine success in a military operation. President George W. Bush did not state in his speech that the war was over, but that the "Major combat operations have ended." During the first

[71] State of enlightment, "Are Obama, Democrats Tougher on Terror?" May 15, 2011, http://stateofenlightenment.com/2011/05/15/are-obama-democrats-tougher-on-terror-2/

[72] CBS NEWS "Mission Accomplished, 5 Years Later" February 11, 2009, http://www.cbsnews.com/stories/2008/05/01/iraq/main4060963.shtml.

two months of the war when the major combat operations were carried out, the U.S. forces had 138 casualties. From the end of the major combat operations in May 2003 until the end of 2009 an additional 4144 U.S. service members were killed.[73] The hostile actions in Iraq continued and the American flag was not lowered until December 15, 2011, officially declaring the end of the Iraq War.[74] The quote also describes the need to understand the idea of success in conflicts and how success can be achieved when using force in a conflict. In this case, it can be argued that the military part of the Second Gulf War, or the Iraq War, was one of several efforts moving towards the end state of peace in Iraq, but importantly not the only effort. The end of military operations is not the end of the effort to establish a peaceful, democratic, and stable Iraq. Figure 4 also shows the importance of orchestrating all efforts towards the campaign end-state. A simple banner behind the president caused many of the target audience to believe that the war was over and the forces could return safely. History turned out differently.

There is no second place in war, no silver medal for good efforts. Therefore, both sides will evaluate their chance to succeed before resorting to physical violence. An important ingredient in this evaluation is the will to fight, and the people's will to make deadly sacrifices. Clausewitz argues this in his famous discussion concerning the "trinity," which is an interactive set of three forces that drive the events of war that consists of:

> primordial violence, hatred, and enmity, which are to be regarded as a blind natural force; of the play of chance and probability, within

[73] Global security.org "U.S. Casualties in Iraq" (n.d.) http://www.globalsecurity.org/military/ops/iraq_casualties.htm,

[74] The date can be found in many different sources, as an example: Thom Shanker, Michael S. Schmidt and Robert F. Worth, "In Baghdad, Panetta Leads Uneasy Moment of Closure" December 15 2011, http://www.nytimes.com/2011/12/16/world/middleeast/panetta-in-baghdad-for-iraq-military-handover-ceremony.html?pagewanted=all,

> which the creative spirit is free to roam; and its element of subordination, as an instrument of policy, which makes it subject to reason alone.[75]

The natural force involved in war belongs to the people of a country. This blind natural force of violence that blazes up in war must be inherent in the people before the violence begins.[76] According to Clausewitz, the will to fight must emanate from the people, concentrated in a political will to endanger your country's freedom and independence in order to gain political success. The will to fight must be related to the probability of success. Otherwise, there will be a likelihood that the people's will diminishes and one side surrenders, even before the hostilities begin. Throughout history, there are few examples of states surrendering without a fight. More common has been fierce fighting even though one side is clearly inferior to the other. Obviously, the question arises: why do the people believe in success even if all indications and calculated probabilities forecast defeat? Dominic Johnson discusses this issue in his book, "*Overconfidence and War,*"[77] that there is a general overconfidence in the assumption of one's own ability to put up resistance or to conduct an attack on the enemy. This overconfidence explains better why war is waged even though all rational arguments speak against it. It also introduces relativity for the term success. Victory in itself is taken to confirm that the victor was the stronger party, even though the actual reason might have been a smart concentration of available units, smart use of the terrain or just luck.[78]

The outcome of war is dependent upon many factors, such as operational and tactical superiority, available reserves, better logistics, and higher morale. All

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[75] Carl von Clausewitz, *On War*, trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976), 89.

[76] Carl von Clausewitz, *On War*, trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976), 89.

[77] Dominic Johnson, *Overconfidence and War* (Cambridge, MA: Harvard University Press, 2004), 3.

[78] Stuart Albert and Edward C. Luck, *On the Endings of Wars* (Port Washington, N.Y: Kennikat Press Corporation, 1980), 53.

of these can be considered measurements of strength. Victory, however, can also be dependent upon superior production capability[79] or the availability of natural resources, such as crude oil. Clausewitz mentions the increasing importance of production capacity in his discussion concerning strategy: “In tactics as in strategy, superiority in numbers is the most common element in victory.”[80]

Even if Clausewitz’s empiricism is based on observations from conflicts in the early 19th Century (pre-industrialization age), his discussion regarding numbers is still valid, especially in traditional warfare. The industrialization of Western Europe and North America is considered to be a starting point of a new generation of warfare, the industrialized war. This type of war is dependent on production capability to a much higher degree than before. Does this conclude that success in modern warfare solely can be explained by resource differences between countries? Not really. If the adversary uses forces economically and only engages in combat under favorable situations, a smaller force can still beat a larger. The use of your forces has a direct impact on your probability for success, and as Wayne P. Hughes states: “Warfare is deadly conflict. Tactics, being the devices of battle, are conceived and executed at the physical and metaphorical center of this violence.”[81]

When defining success, it is important to understand the fundamentals of warfare. War is a sequence of battles and there is no automatic correlation between successes at the tactical level with the general outcome of the war. Of course, if one side wins all the battles and succeeds in destroying the opposing forces, then that side is considered to be the stronger party and will likely win the

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[79] Niklas Zetterling, *Blixtkrig,* (Stockholm: Försvarshögskolan, 2003), 47–48. The author presents production capacity numbers for fighter aircrafts and tanks during the WWII for different countries. Based on the facts, he argues that eventually the superior production capacity for the allied countries determined the outcome of WWII.

[80] Carl von Clausewitz, *“On War,”* Book 3, Chapter 8.

[81] Wayne, P Hughes Jr., *FLEET TACTICS Theory and Practice* (Annapolis, MD: U.S. Naval Institute, 1986), 26.

war. The connection between the levels of war can be achieved through a comprehensive campaign plan that relates success at each level to a strategic objective. When examining history, mere success in battle is not equivalent to final success in war. Destruction of the opposing forces is just as important, if not more so. The German Wehrmacht initially achieved substantial territorial gains, but at the end could not withstand the Allied Forces and lost WWII. It is claimed that the United States did not lose a major battle in Vietnam. Still the outcome of the war is unanimously regarded as a victory for North Vietnam and a defeat for the United States and its South Vietnamese ally, resulting in unification under the control of the North.[82]

This demonstrates that success must be related to what is measured. This seems obvious, but as mentioned earlier, success in a single battle does not mean success in war. In the military context it is important to establish objectives in order to determine success at the tactical, operational and strategic levels. The objectives must be connected to each other through a top-down process, through campaign planning in order to create a coherent chain of objectives. In the Vietnam War example, the U.S. forces achieved an outstanding success at the tactical level, but the war was still lost at the strategic level.

So far, the discussion has shown that success in warfare is not an absolute term. Rather, it is in “the eye of the beholder” and it is dependent on the level of warfare being examined. All the difficulties aside, few wars have ended in a tie with regard to the military outcome. A clarifying example is to return to the Iraq War mentioned in the beginning of this chapter. Success was achieved by

[82] Louis Jacobson. “Did the U.S. win major battles in losing Vietnam?” September 6, 2011 http://www.politifact.com/truth-o-meter/article/2011/sep/06/did-us-win-major-battles-losing-vietnam/,

the Coalition at the lower levels of war, as the Iraqi military forces almost ceased to exist; however, the strategic objectives were not met, or even properly defined.[83]

With that in mind, it was an overly bold statement to declare, "MISSION ACCOMPLISHED" on the flyer above President Bush during his speech. It can even be argued, based on the number of casualties since, that the statement that "major combat operations have ended" was too optimistic. The mission for the war, to which overall success should be measured against, was not well thought out.

Almost all literature covering general military theory presents a list called the "principles of war." The list consists of approximately ten historically based principles that the commander and his staff need to take into consideration when planning for and executing war. The first principle is "Objective" or "The Selection and Maintenance of the Aim." The necessity to define objectives for your operation is so fundamental in armed conflict that this is regarded as the "Master Principle" and is always the first on the list of the principles of war, regardless of which list you reference.[84]

Therefore, the first and most important step when planning an operation is to select and clearly define the aim.[85] The overall aim provides guidance when planning operations on the operational and tactical level. Inside the overall aim,

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[83] The non-governmental organization, "The National Security Archive," has published three on-line articles analyzing the Iraq war and, based on declassified and unclassified material, article two questions if there even was a decision to start a war prior to the operation:

John Prados and Christopher Ames "THE IRAQ WAR – PART II: Was There Even a Decision?" October 1, 2010,
http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB328/index.htm,

[84] United Kingdom, The Joint Doctrine & Concepts Centre, Joint Warfare Publication 0-01*, British Defence Doctrine* (Swindon: Ministry of Defence, 2001), 3–2.

[85] See for instance: United States. Joint Chief of Staff, Joint Publication 1, *U.S. Joint Publication 1 Doctrine for the Armed Forces of the United States* (Washington D.C., 2009) I-2 and I-22.
For a more explanatory text see: United Kingdom, The Joint Doctrine & Concepts Centre, Joint Warfare Publication 0-01*, British Defence Doctrine* (Swindon: Ministry of Defence, 2001), 3–1.

each operation must be directed towards this goal. The planners must analyze, interpret, and define the limited objectives for each individual operation.[86] From the operational to the tactical level, objectives are turned into tasks for the component commanders. The levels of war and each level's relationship between end state, objectives, effects, mission and tasks are presented in Figure 5:

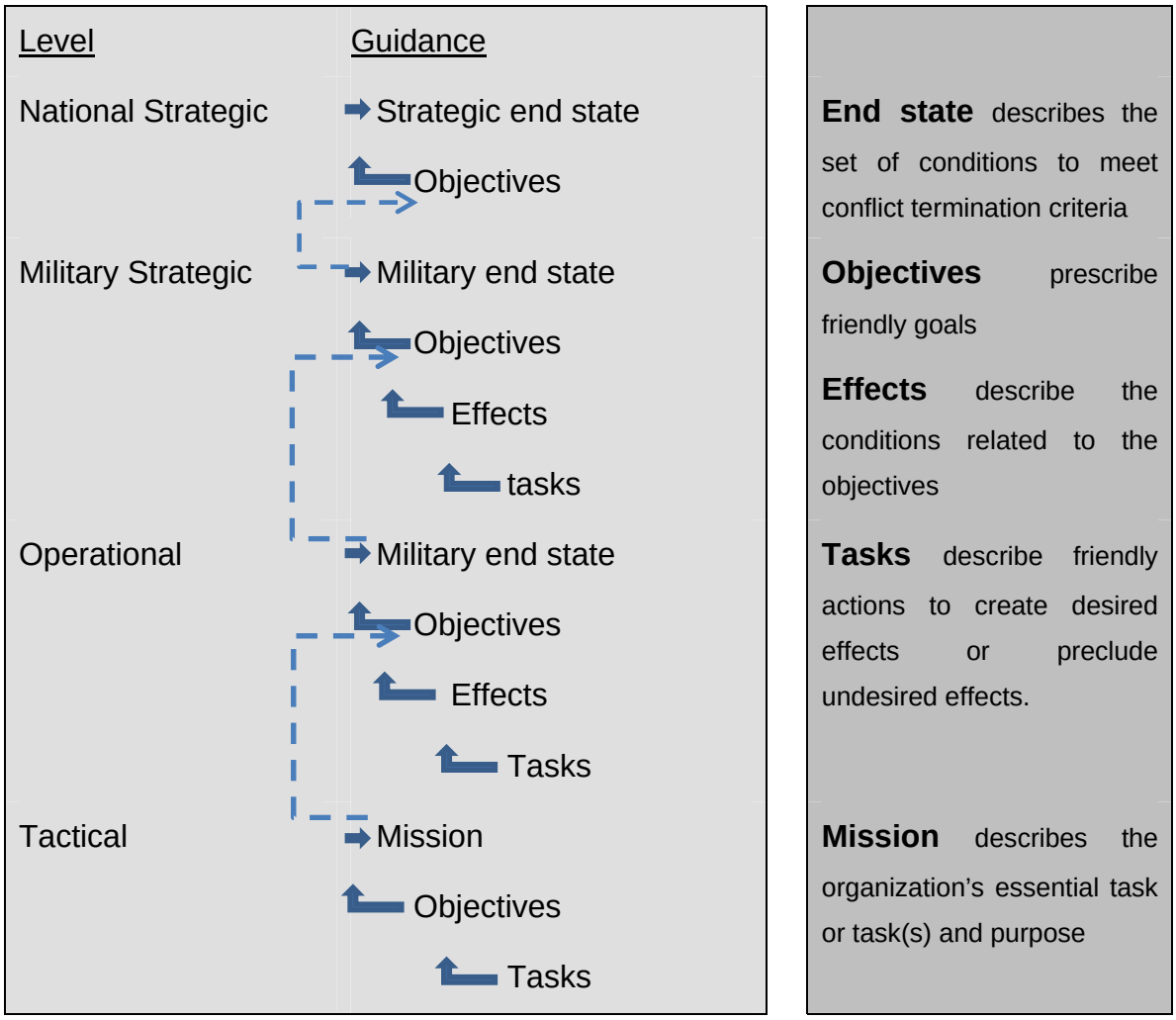

Figure 5 Levels of war related to end state objectives and tasks.[87]

[86] Sam B. Gardiner, Bruce Pirnie, *An objectives-Approach to Military Campaign Analysis* (Santa Monica, CA: RAND, 1996), 16.

[87] After: United States Joint Chief of Staff, Joint Publication 5-0, *Joint Operation Planning* (Washington, D.C, 2011) III-21.

According to the U.S. Joint Publication 1–02 "Department of Defense Dictionary of Military and Associated Terms" the term objective is defined as:

1. The clearly defined, decisive and attainable goal toward which every operation is directed.

2. The specific target of the action taken which is essential to the commander's plan.[88]

Objectives provide commanders and staff with references to measure the outcome of an operation by comparing the actual situation and the desired situation as described by the objectives established for the operation.

Success can be described as the favorable outcome of something attempted. An objective is a description of a desired situation after the action has taken place. If these two terms are combined together, they create a definition of success that is general, but still precise enough to be applied in a military context:

Success is the measured level of fulfillment of pre-determined objectives on all levels of war, either isolated or orchestrated in combined efforts.

This assumes, critically, that the mission analysis is properly conducted and that the objectives are properly defined. Success in this definition is simply a measurement and it is completely dependent on the planner's ability to clearly and timely define decisive and attainable goals. Furthermore, the definition is not related to any physical thresholds, such as destruction of the enemy or seizure of the nation. Each operation will define appropriate thresholds, and eventually the outcome will determine the level of success. It also addresses the relationship between a single objective and a desired campaign end-state.

Finally, the relationship between success and victory should be noted. The term victory is frequently used in military literature. Victory usually refers to a final

[88] United States U.S. Joint Chief of Staff, Joint Publication 1–02, *Department of Defense Dictionary of Military and Associated Terms* (Washington, D.C, 2011), 237, s.v. "*objective"*

success. Its nature is binary. Either you achieve victory or you fail. Seldom is the term used to describe a limited victory or "small victory." [89] As with many other frequently used terms, the definition varies with the author. In the present thesis research, victory will be viewed as equal to success.

F. CONCLUDING REMARKS OF THE CHAPTER

The aim for this chapter has been to create a foundation for the following discussion and conclusions. As shown, information and its use in military operations is a complex topic and a rather young discipline, still undergoing significant development. For any further work based on this thesis, the development of the definition for information operations must be analyzed in order to remain relevant to the general discussion.

[89] Collins Cobuild, *Advanced learners English Dictionary* (HarperCollins Publishers, Glasgow, Great Britain: 2003) s.v: "*victory*"

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IV. DISCUSSION AND FINDINGS

This chapter will discuss and present answers to the research questions. Initially success in information operations is discussed: what it is and how it is determined. In order to better understand how success is determined the answer is divided into two sub-answers: determination of success in the past tense and future tense. Then the text discusses the challenges of evaluating an effects based approach as proposed in the referenced doctrines. Thereafter, the chapter describes what success is and how it is determined in the maritime domain. Finally, the chapter applies the terminology and methodology from the maritime domain onto the information environment and discusses the benefits of using that domain's established concept of success.

A. INFORMATION OPERATIONS

Ultimately, information operations are construed of battles over the decision makers' minds. Using a number of different capabilities and methods, information operations seeks to influence an adversary's will and thus negatively affect decision-making capabilities while at the same time protecting one's own commander from being adversely influenced. Physical destruction of targets linked to information operations objectives is dual-nature in this sense. For example, a destroyed radio station both represents traditional destruction, similar to other kinetic targets, but it also affects the adversary's capability to exercise command and it can, if correctly applied, be a strong message to the adversary's armed forces and population.[90] The other capabilities used in information operations are mainly non-kinetic and use the physical and informational dimensions to affect the adversary's cognitive dimension, with the aim of slowing

[90] United Kingdom, The Joint Doctrine & Concepts Centre, Joint Warfare Publication 3-80, *Information Operations* (Swindon: Ministry of Defence, 2002), 2A-2, § 2A7.

down decision-making processes or reshaping the physical battle space, either in real terms or in the enemy's mind, creating real effects.[91]

The challenge when defining success in information operations is to know if the operation has affected adversary behavior completely, a little, or not at all. This is especially valid if information operations is used in a conflict, where there is little or no possibility to interact with the target or the population of the target, i.e., traditional warfare where the opposing forces are fighting each other on defined fronts. Identifying and understanding relevant indicators to measure an adversary's change of behavior is difficult to say the least. It is easier to evaluate information operations in UN Chapter V (peacekeeping) or VII (peace enforcement) operations,[92] where a neutral force stands in between the opposing parties and has the ability to interact with both parties as well as the civilian population.

1. What is Success in Information Operations?

> "For I am Vader! Darth Vader! Lord Vader! I can kill you with a single thought!"
>
> —British Comedian Eddie Izzard, impersonation of Darth Vader[93]

Hopefully, we will never come to a situation where we are able to kill each other with a single thought, but the use of information has evolved during the

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[91] Sweden Försvarsmakten, *Handbok Informationsoperationer* (Stockholm, HKV, M7739–352014, 2008), 15.

[92] United Nations Peacekeeping "Role of the Security Council" (n.d.), http://www.un.org/en/peacekeeping/operations/rolesc.shtml,

[93] For a full version of the performance see: Eddie Izard, "Eddie Izzard Star Wars Canteen" June 14 2010 http://www.youtube.com/watch?v=Bq03xebtbeU&feature=related

revolution in military affairs to not only support warfare, but to emerge as a weapon itself.[94] This development has called for a theoretical discussion concerning information warfare.

As information warfare emerged as a stand-alone discipline in the military, a theoretical discussion evolved within the information community trying to establish a definition of absolute information dominance. This was an attempt to find a general definition similar to Clausewitz's statement regarding the ultimate success in war: "The complete or partial destruction of the enemy must be regarded as the sole object of all engagements."[95]

As an outcome of this discussion, the expression Information Superiority was introduced to explain and envision the state of absolute control over one's own information flow and, at the same time, achieving full control over the opposing forces ability to use the information environment. The importance of superiority is more pronounced in visionary documents than in doctrinal documents. It is also more pronounced in U.S. documents than in British documents or in other countries with more limited military resources. The reason for the U.S. focus on achieving information superiority might be explained by the fact that the United States has the resources to establish conventional military superiority and easily envisions the possibility of establishing superiority in the information environment, despite the difficulty that is acknowledged for doing so. The United States follows a desire to explore this possibility. The two terms can, similarly to Clausewitz's definition of the ultimate aim for warfare, be a good starting point for establishing a definition of what is success in information operations. Information superiority is defined in "*Joint Vision 2010"* as: "The capability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying an adversary's ability to do the same."*[96]*

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94 Department of the Navy, Chief of Naval Operations for Information, Dominance, *U.S. Navy's Vision for Information Dominance* (Washington, D.C., 2010), 6.

95 Clausewitz, *On War,* 226–229.

96 United States, Joint Chiefs of Staff, *Joint Vision 2010* (Washington, D.C: Pentagon) 16.

The ultimate aim for information superiority should, in accordance with the aforementioned definition, be to establish an information environment where one side has unlimited control of the flow of information, including the capability to control the adversary's use of it. Absolute success would then be accomplished when a state of information superiority was established. However, also similar to traditional warfare, success in information operations has moved towards a more graded scale. The British doctrine "*Joint Warfare Publication 3–80, Information Operations"* states: "by undermining his will, cohesion and decision-making ability through affecting his information, information-based processes and systems" to describe the desired effects information operations should achieve.

This calls for a need to grade success with more than a binary definition; something more than absolute control or no control is required. In order to create a general definition of success with the ability to grade the level of accomplishment, the general definition of success from the previous discussion has been slightly adjusted, although its core definition is still valid:

Success in information operations is a favorable level of fulfillment of related objectives on all levels of war, either isolated or orchestrated in combined efforts.

There are other perspectives of success in information operations, as Robert Leonhard argues in his book, "*The Principles of War for the Information Age"* about the reasons why to conduct information operations*: "*It is about making the friendly force move faster, shoot better and protect itself more economically. It is about slowing the enemy, disrupting his operations demoralizing him."[97] Patrick D. Allen argues in his book, *"Information Operations*

[97] Robert R. Leonard, *The Principles of War for the Information Age* (Novato CA: Presidio Press, 1998), 232.

Planning" that the ultimate objective for information operations is to change the behavior of the enemy commander because of the conducted information operations.[98]

It can be argued that the different definitions are purely semantic, but they show that there is no widely accepted overall success definition within the information operations community. Success in information is, therefore defined as stated above.

2. How is Success Determined in Information Operations?

It might be seen as a contradiction, but success can, and in military planning must, be discussed from both a predictive and an evaluative perspective. The reasons for the need to differentiate between the perspectives can be found in the military planning process. In warfare, the need to predict the future is more important than evaluating the past. One of the first steps in operational planning is to establish a desired end-state and the purpose of the operation, i.e., a wished-for favorable change in the area of operations and/or the behavior of the adversary from the current situation. A clear end-state is also critical when choosing a line of operations, and later on when assigning troops to carry out tasks. If this is not done properly the possibility of victory is considerably diminished. [99]

It is easier to measure from the evaluative perspective, as the measurements are conducted after the event has occurred, and the answers are available to be collected with appropriate evaluation tools. This is why it is so prevalent to examine the past, to "fight the last war." The predictive perspective cannot be easily measured. Instead, it requires estimates of the adversary's reactions and how the intended actions affect the area of operations. Information operations aggravates the circumstances by including mainly non-kinetic and

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[98] Patrick D. Allen, *Information Operations Planning* (Norwood, MA: Artech House, 2007), 44.

[99] United States, Joint Chief of Staff, Joint Publication 5-0, *Joint Operation Planning* (Washington, D.C, 2011) IV-5.

often non-visible effects. Often there are no bomb craters or destroyed weapons platforms to reveal the outcome of the efforts. Trying to predict the outcome is surrounded by a degree of uncertainty.

Determining success in information operations should also be discussed by using internal versus external objectives. An internal or cognitive objective is aiming at the will, either influencing an adversary or protecting one's own forces from any attempt to be influenced. This type of objective relates to a change in the cognitive dimension of the target audience. An internal objective must be determined for each operation as it places emphasis on the cognitive perceptual differences between prior and post-operation situations in a defined area of operation.[100] An external objective is defined by a desired change of the environment or the capabilities for decision-making. It does not emphasize the current situation as much as it focuses on the desired situation after the operation.

Another factor to consider is the time and space alignment with the traditional warfighting domains. In a perfect world, there are no time constraints and each information operation can be continued until the desired effect is achieved and evaluated before the next phase is initiated. In modern warfare, however, different actions must be synchronized. This is done by constructing distinctive phases separated in time and space, often through a campaign.[101]

An operation usually moves to the next phase when it is assessed that the objectives for the current phase have been achieved.[102] In joint operations, information operations typically have a supporting function to the overall

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[100] United Kingdom, The Joint Doctrine & Concepts Centre, Joint Warfare Publication 3-80, *Information Operations* (Swindon: Ministry of Defence, 2002), 3A-1.

[101] United States U.S. Joint Chief of Staff, Joint Publication 3-0, *Joint Operations* (Washington, D.C., 2011) V-5–6.

[102] Ibid., V-7.

operation, although they occasionally may form the main effort.[103] The pace with which the operation is moving forward is decided by the main effort for the operation. An information operation must be able to keep up with the overall battle tempo.

The two time tenses presented above will be discussed more thoroughly to be able more accurately answer the thesis research question.

3. An Evaluative Approach to Determine Success

The U.S., British and Swedish information operations doctrines all discuss evaluation as the method to determine the outcome of an information operation. In these doctrines, the determination of success is conducted by analyzing the relationship between action and reaction. Furthermore, all three doctrines focus on internal, cognitive objectives. The doctrines suggest that post-action evaluation is divided into two sub parts: measuring action and reaction.

- Evaluating action is about measuring how well a specific task is carried out. This is also referred to as a measurement of performance (MOP).
- Evaluating reaction is about measuring how the specific task changed the target's behavior or will to fight. This is also referred to as measurement of effectiveness (MOE).[104]
- Physical destruction and other lethal reactions to an information operation are subject to the same evaluation as all other warfare: did the action physically affect the target or not? If not, repeat the action.

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[103] United States. Joint Chief of Staff, Joint Publication 3-13, *Information Operations* (Washington, D.C., 2006) I-1.

[104] United States. Joint Chief of Staff, Joint Publication 3-13, *Information Operations* (Washington, D.C., 2006) V-7.

Hence, MOEs are not equal to objectives. They are a measure of the effect the action had on the adversary force, the environment or the population. MOE must be defined for each operation and they must be related to the objectives for the operation in order to facilitate an evaluation of real-life results in comparison to the desired effects. They must be measurable either qualitatively or quantitatively. The desired effects must be realistic. Furthermore, it is essential that a recognized situational picture of the area of operation be established prior to the operation if MOE shall be used. Otherwise, it is very difficult, if not impossible, to measure the difference before and after an operation.[105]

Examples of the relationships between information operations capabilities, MOPs and MOEs are presented in Table 3, which is taken from the U.S. Joint Publication 3–13, "*Information Operations.*" Note the examples of MOEs in the third column. All of them are measurable in the physical domain except the last row, MOE for CNO. The proposed MOE is not measurable without having access to the adversary's own evaluation. This highlights one of the problems with measuring effectiveness in information operations: the ability to measure the correlation between effort and outcome or action and reaction.

[105] Sweden Försvarsmakten, *Handbok Informationsoperationer* (Stockholm, HKV, M7739–352014, 2008), 110.

Capability	Measures of Performance (MOPs)	Measures of Effectiveness (MOEs)	Remarks
Psychological Operations (PSYOP)	Percentage of PSYOP products disseminated	Extent that PSYOP changed the demonstrated behavior of the target audience	Often necessitates further intelligence requirements
Electronic Warfare (EW)	Percentage of adversary command and control (C2) facilities attacked	Effects of attacks on adversary C2 facilities' ability to pass critical information	MOE requires a change in a detectable and measurable activity
Operations Security (OPSEC)	Percentage of identified compromises of critical information or indicators with OPSEC measures applies	Observed adversary actions indicating lack of foreknowledge of friendly operations	MOE requires collation of all leaked information and comparison with adversary actions
Military Deception (MILDEC)	Days between updates on effectiveness of deception plan	Specific adversary actions taken based on friendly deception activities	MOE requires an estimate of how the adversary is expected to react if they do and if they do not believe in the deception
Computer Network Operations (CNO)	Percentage of tasked network attacks conducted	Effect of network attacks on target systems	MOE requires access to a measurable output or to the adversary's own reporting of the attack

Table 3. MOP and MOE relationship[106]

4. Challenges with Measuring Success in Information Operations

There are several challenges involved in the evaluation process when using measures of performance and measure of effectiveness:

- The first challenge is to translate operational objectives into MOE's. This is especially evident if the objectives are internal, i.e., cognitive objectives aimed at affecting the adversary's will.

[106] From: 2006 United States. Joint Chief of Staff, Joint Publication 3-13, *Information Operations* (Washington, D.C., 2006) V-8.

- A feedback process for the operation is necessary so that the operation can be evaluated. This process should have the capability to provide sequential feedback.
- Observable external indicators must be identified revealing changes in the cognitive dimension of the targeted audience.
- An appropriate measuring method must be selected and applied so that the output actually relates to the actions. Again, note how the MOEs are constructed to meet this requirement except for the CNO MOE.
- Even if there are adequate MOEs established, it can be difficult to correlate reactions to a specific desired effect.
- Non-expected reactions or events among the target audience may lead to wrong conclusions and create false positives.
- There is a tendency to overestimate abilities and, consequently, overestimate the importance of actions and the impact they have on the achievement of objectives.[107]
- Finally, the output of the evaluation must be in a format that allows for correlation with the objectives for the information operation.

The bullets above do not represent a fully comprehensive list of all possible challenges in evaluating an information operation, but they show that information operations are difficult to evaluate. This is especially so if there is a need to evaluate events just as they occur or sequentially so that the next set of actions can be adjusted based on how the operation is proceeding.[108]

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[107]Dominic Johnson, *Overconfidence and War* (Cambridge, MA: Harvard University Press, 2004), 3.

[108] Both the bullet list and the last statement in the paragraph is from: Sweden Försvarsmakten, *Handbok Informationsoperationer* (Stockholm, HKV, M7739–352014, 2008), 15, 111–115.

5. A Predictive Approach to Determine Success

The generic idea of predicting success begins with establishing objectives for the operation, with the possibility for success being related to the probability of achieving the stated objectives.[109] To induce a better understanding of the challenges that come with any attempt to predict achievement of objectives, one must recall the definition of information operations:

> Co-ordinated actions undertaken to influence an adversary or potential adversary in support of political and military objectives by undermining his will, cohesion and decision-making ability through affecting his information, information based processes and systems while protecting one's own decision-makers and decision-making processes.[110]

The focus on influencing an adversary's will and decision-making abilities makes it rather difficult to forecast and accurately verbalize reactions of the planned actions in order to meet objectives for the operation. Furthermore, the objectives must include effects in the physical dimension resulting from attempts to influence the cognitive dimension, in order to address the will and decision-making of the adversary. The challenges are enhanced by the fact that information operations are complex by nature, and together with the use of cognitive objectives the process to predict success is difficult, to say the least.[111]

One of the main reasons for having a method to predict success is the commander's guidance, which initiates the operational planning process. This guidance must clearly identify in what way information operations should contribute in order to achieve the overall objectives.[112] Prior to issuing the

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[109] Robert R. Leonard, *The Principles of War for the Information Age* (Novato, CA: Presidio Press, 1998), 147.

[110] United Kingdom, The Joint Doctrine & Concepts Centre, Joint Warfare Publication 3-80, *Information Operations*, (Swindon: Ministry of Defence, 2002), 2-1.

[111] Robert R. Leonard, *The Principles of War for the Information Age* (Novato, CA: Presidio Press, 1998), 176

[112] United Kingdom, The Joint Doctrine & Concepts Centre, Joint Warfare Publication 3-80, *Information Operations* (Swindon: Ministry of Defence, 2002), 3-2.

guidance, the commander must have a good sense of what is needed and what is attainable in order to ensure a successful operation.

The doctrines examined do not provide guidelines on how to identify and formulate guidance that is recognizable and easy to comprehend by all staff personnel. If possible, this process should also be recyclable, which further enhances the recognition factor. Instead, the outlined procedures require a unique set of directions for each operation.[113] The traditional domains' doctrines have more explicitly pronounced principles concerning the purpose in deploying military forces in an area of operations. The maritime domain, for instance, requires naval presence if a nation wants to control its own territorial waters, and even more importantly, the ability to secure the flow of exported and imported goods over the sea. The governing principle or general concept of operation in this case is called "control at sea."[114]

The governing principles correlate to external objectives, i.e., a desired end state of what the maritime area of operation should look like after the actions have been carried out. Everybody who has ever been involved in planning for a maritime operation is familiar with the general concept of maritime operations. This recognition factor creates a situation where the staff immediately acquires a high level of understanding when operations are being planned. It also enables the use of a standardized and recyclable processes for the staff.

In order to visualize the difference in approaches, here is a metaphor. Imagine reading restaurant reviews and this is the initiating direction for the decision on where to go out and eat tonight. Taste is a relative and cognitive experience based on previous experiences and preferences. If the reviewer would write the review only to satisfy a certain cognitive dimension, he/she could go on about the texture of the mousse d'écrevisse or the extraordinary cooked

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[113] Sweden Försvarsmakten, *Handbok Informationsoperationer* (Stockholm, HKV, M7739–352014, 2008), 15.

[114] United Kingdom Ministry of Defence, Joint Doctrine Publication 0-10, *British Maritime Doctrine* (Swindon: Ministry of Defence, 2011), 2-10.

emulsion of egg yolk and butter, seasoned with lemon juice, salt and a little white pepper. An expert could easily understand that this restaurant is specialized in seafood and specifically French fine dining.[115] For most readers, however, this would make no sense. Instead, most reviewers follow a set pattern. First, they provide the basic information about the setting, impression of the atmosphere, the service and, of course, what kind of food served at the restaurant (Italian, seafood or maybe steaks). Then the reviewer will mention the specific food consumed and the general impression of the quality and taste of the food served. The readers, especially if they have read multiple reviews from the same reviewer, will recognize the structure of the review, core words and would be able to relate the review with their own preferences. The purpose for the review will be satisfied by both examples. Both will appeal to their cognitive dimension of satisfying their hunger. Both are written in non-quantitative terms. However, one will appeal to a larger audience, the other to a very small group of professionals.

The metaphor is used to show that if a recognized and recycled concept of operations is used in the planning process it is easier to reach broader understanding and acceptance for the operation.

6. Findings

The problem with determining success in information operations is the complexity of the information environment. The analyzed doctrines all focus on post-action evaluation in order to measure success. They also require the use of effects to determine success. The challenges of transforming activities and objectives into related effects were highlighted in the chapter and further add complexity to the subject. None of the doctrines gives any clear answer on how to receive timely evaluation on how the operation is proceeding in order for appropriate adjustments to be applied to the ongoing operation. The lack of recognized general concepts of operations can hamper the ability to issue

[115] Mousse d'écrevisse is a pate made of Norwegian lobster and the emulsion is a Hollandaise sauce.

effective directives, and as a result make it more difficult to predict the outcome of an information operation and optimize the power of information.

B. APPLYING MARITIME TERMINOLOGY AND PRINCIPLES TO INFORMATION OPERATIONS

> When a thing has been said and said well, have no scruple. Take it and copy it.
>
> —Anatole France, French writer, member of the French Academy and Nobel Prize winner in literature in 1921.

The information environment and the maritime domain share many characteristics. Neither of them can be contained or seized, but both need to be mastered in warfare. There is no possible way to establish a permanent occupation. As soon as a force leaves the area of operation, it is free again. The similarities are somewhat apparent when studying information operations literature. There are discussions regarding information superiority, an offspring from the older established maritime term “sea superiority.” The literature, however, does not make a complete leap towards copying the entire set of principles already established in naval doctrine and naval theoretical literature.

What is important to understand in both cases is the reason for fighting over “empty space.” In the maritime domain, this is concerned with sea lines of communications. In the information environment, it is all about information flow and content. Both concern the right for each nation to establish and manage communications without interference from an adversary. The maritime domain uses the lines of communication for transports of goods and passengers while the other information environment uses them to send and receive information.

Because the two fight a similar battle and struggle with battlefields that are hard-to-hold and define, the similarities seem significant enough for a comparison to be constructive and enlightening. Therefore, in order to pursue further the search for how success can be determined, an analysis of how success is defined in the maritime domain will be performed, and then this

analysis will be applied to the information environment. Finally, findings will be discussed followed by a general conclusion.

1. The Maritime Domain and Overall Objectives for Naval Forces

The sea covers approximately 70 percent of the Earth's surface and the vast majority of the sea is so called "high seas which consist of all the sea that is geographically outside any legal jurisdiction from a single state." Therefore, their judicial status is regulated in various conventions.[116]

The zones between the shoreline and high seas are called national maritime zones. This is where the coastal states have extended their jurisdiction. Foreign warships and submarines still have unrestricted access to the outer parts of this zone for exercises and routine operations.[117]

No matter the judicial status, the sea cannot be permanently occupied by humans, and borders are not visible other than as lines on a sea chart. There are no road signs telling you that you are leaving U.S. sea territory. The sea cannot be inhabited or fortified. Therefore, a maritime operation will not change the geography or leave any permanent signs that a certain part of the sea belongs to a specific state. Furthermore, it is not possible to build fences around a state's sea territory and prohibit trespassing. On the contrary, the *United Nations Convention on the Law of the Sea* states that: "Subject to this Convention, ships of all States, whether coastal or land-locked, enjoy the right of innocent passage through the territorial sea."[118]

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116 "United Nations, Convention on the Law of the Sea" (n.d.), http://www.un.org/Depts/los/convention_agreements/texts/unclos/unclos_e.pdf , Part VII, article 86–120,. (Article 89 claims that "No State may validly purport to subject any part of the high seas to its sovereignty").

117 United Kingdom, Ministry of Defence, Joint Doctrine Publication 0-10, *British Maritime Doctrine* (Swindon: Ministry of Defence, 2011), 1–6.

118 United Nations, "United Nations Convention on the Law of the Sea" (n.d.), http://www.un.org/Depts/los/convention_agreements/texts/unclos/unclos_e.pdf , Part II, article 17,

The geographic differences between land and sea warfare renders that the purpose and aim of sea warfare is different from land warfare.[119] The ultimate purpose with traditional land warfare is always connected to territorial claims. Despite its lethality, sea warfare can, at the most, contribute with decisive supporting actions for land warfare. [120]

So, why spend tremendous amounts of resources to build and maintain a navy if they have merely a supporting role in warfare? The answer is the sea's enormous importance for transportation. As an example, approximately 95 percent of U.S. foreign trade passes through U.S. ports, and the volume of commerce using sea transport is foreseen to increase significantly in the future.[121]

The domination of sea transportation has been constant throughout history. All states with a merchant fleet have felt it necessary to build and operate a navy to protect their commercial trade routes.[122] The importance of the sea trade routes has been recognized and discussed since sea warfare began to be studied in a scientific context. One of the first to study naval warfare was Julian Corbett, a British naval historian and geo-strategist, who concluded that naval warfare is all about controlling the sea lines of communications:

> The object of naval warfare is control of communications, and not, as in land warfare, the conquest of territory. The difference is fundamental. True, it is rightly said that strategy ashore is mainly a question of communications, but they are communications in

[119]David Jablonsky, ed. *Roots of strategy* (Mechanicsburg, PA: Stackpole Books, 1999), 231.

[120] Christopher Werner, *Den blå boken, Marina stridskrafter ur ett militärteoretiskt perspektiv*, (Stockholm: Försvarshögskolan, 2002), 43.

[121] NOAA, "Revitalizing Ports to Benefit Economic Activity and Healthy Ecosystems,"" Revised October 5, 2007, http://coastalmanagement.noaa.gov/portfields.htm,

[122] Marco Smedberg, *Om sjökriget, Från Svensksund till Smygteknik* (Stockholm: Page One publishing,1996), 11–13.

> another sense. The phrase refers to communications of the army alone, and not to the wider communications which are part of the life of the nation.[123]

The term sea control (early naval theorists used the term command of the sea, but the development of naval theory changed the term to control instead of command) is commonly used as the highest objective for naval warfare. The Swedish naval officer and theorist Christopher Werner divides this overall objective into three sub-objectives:

- Establish sea control
- Exercise sea control
- Dispute sea control[124]

Sea control is a means to an end to secure sea lines of communications. Geoffrey Till concurs with this conclusion in his book, *Sea Power, A Guide for the Twenty-First Century,* where he argues that exploitation of sea control is the ultimate goal.[125] The author Raul Castex argues that sea control consists of "the control of essential maritime communications."[126]

A state's ability to establish and maintain sea control, denying it to an opposing navy, is the overall objective for a state's navy. Sea control exists when there is freedom of action to use an area of the sea for one's own purposes, and if necessary deny its use to an opponent. Logically, if you have sea control your opponent will not be able to interfere with your naval activities in that area. If an

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123 David Jablonsky, ed. *Roots of Strategy* (Mechanicsburg, PA: Stackpole Books, 1999), 233.

124 Christopher Werner, *Den Blå Boken*, Marina *Stridskrafter ur ett Militärteoretiskt Perspektiv*, (Stockholm: Försvarshögskolan, 2002), 43 (thesis author's translation).

125 Geoffrey Till, *Seapower, A Guide for the Twenty-First Century* (London: Frank Cass publishers, 2004), 157.

126 Eugenia C Kiesling, ed. *Classics of Seapower, Strategic Theories* (Annapolis, MD: United States Naval Institute, 1994), 56.

opponent successfully contests your sea control, you can no longer claim sea control and your operations will be focused on regaining sea control or continuing to contest it.

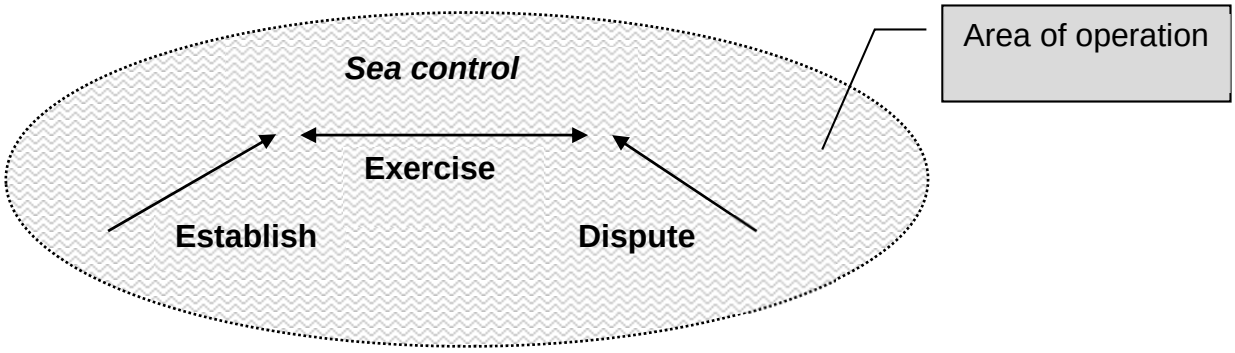

Figure 6. Concept of naval operations

2. What is Sea Control?

Julian Corbett's classic definition of sea control was published 1911[127] and has since then maintained a worldwide central position in naval theory. However, several theorists have published their own versions. The main difference between the definitions addresses the degree of control required to claim sea control. The most extreme is the necessity to achieve absolute control in the entire area of operations. As an example, the U.S. "*Naval Doctrine Publication 1, Naval Warfare"* does not address control at sea specifically. Instead, the publication uses "Battle Space Dominance" to describe a situation where the United States has full superiority in a defined zone or area of operation.[128] Achieving battle space dominance is both desirable and realistic for a superpower such as the United States.

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[127]. David Jablonsky, ed. *Roots of Strategy* (Mechanicsburg, PA: Stackpole Books, 1999), 3.

[128] United States, Department of the Navy, Naval Doctrine Publication 1, *Naval Warfare* (Washington, D.C., 1994), 63–64.

Battle space dominance, however, is almost a utopia for countries with limited resources and limited naval warfare ambitions. Instead, establishing sea control should be amended with specified limitations in order to make the task realistic and achievable. The naval theorist Geoffrey Till mentions five factors that should be taken into consideration when discussing sea control:[129]

- **Time**. Based on historic evidence, sea control is not constant over time. No country has so far dominated the maritime operating area to the extent that a permanent sea control has been achieved and maintained over an extended period.
- **Place**. The sea control can extend over the entire area of operation or just a part of the area.
- **Extent of use**. Sea control can only be achieved to a degree. The opposing navy can usually pose some threat to your sea control.
- **Strategic consequence**. The importance of achieving and maintaining sea control in a specific area is dependent upon the opponent's strength in the adjacent land and air theater of war. Sea control can be negated if the opposing force is superior in strength in the other domains.
- **Necessity**. There is a need to establish a local sea control to a predetermined degree in order to conduct naval operations, but the need for an absolute sea control is questionable.

These five bullets summarize a common ground about modern sea control among contemporary naval theorists. Sea control is a relative term with several parameters to take into consideration when planning or conducting naval operations.

[129] Geoffrey Till, *Seapower, A Guide for the Twenty-First Century* (London: Frank Cass publishers, 2004), 150–151.

This discussion has posited that the ultimate goal for traditional naval operations is to establish sea control in order to secure sea lines of communications for one's own need and purposes. If a navy does not have the capability and resources to establish sea control, it can still significantly disturb and cause severe economic and other challenges to an opponent by contesting sea control. As an example, when one large car carrier ship is sunk, 8000 cars are also sunk, which will have multiple and significant effects. There are economic aspects on losing a whole cargo ship; but even worse, this creates a feeling of uncertainty and insecurity for civilians who most probably will call for actions in order to re-establish sea control.[130]

3. Establish Sea Control

Sea control can essentially be achieved in two ways: destruction of the enemy through decisive battle or containment of the opponent's navy through blockade.[131]

It is worth mentioning that Geoffrey Till has included "fleet-in-being" as a way to achieve sea control.[132] Apart from that, the first two methods are considered the two primary ways to achieve sea control among naval theorists.[133]

a. Decisive Battle

The decisive battle is potentially the quickest, though the most risky, way to establish sea control. The objective for the battle is annihilation of the enemy's naval force. Raul Castex describes the objective for naval warfare

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[130] EU NAVFOR Somalia "Hijacked M/V ASIAN GLORY Arrives Off Somalia," January 5, 2010, http://www.eunavfor.eu/2010/01/hijacked-mv-asian-glory-arrives-off-somalia/

[131] United Kingdom Ministry of Defence, Joint Doctrine Publication 0-10, *British Maritime Doctrine* (Swindon: Ministry of Defence, 2011), 223; § 2-11.

[132] Geoffrey Till, *Seapower, A Guide for the Twenty-First Century* (London, Frank Cass Publishers: 2004), 162.

[133] Ibid., 162.

as follows: “Thus, we will attempt before everything, in one way or another, to put the principal enemy fleet out of action. The best method is obviously to destroy it in battle.”[134]

The trend is that decisive battle is becoming rarer. Instead, it has been replaced by a series of battles where the ultimate aim is still to annihilate the enemy’s naval force, but doing that systematically.[135]

b. Blockade

Another way to establish sea control is by blockade. This can be distant or close. The method of seizing choke points is argued by contemporary naval theory as a form of blockade, which means that you control a passage or strait, which the opponent has to pass in order to reach the area of operation.

Blockade has been successful in the past, but modern long distance weapons have reduced the necessity to be physically present in the area of operations. Furthermore, a blockade requires a huge superiority in sheer number of ships to be successful.[136]

4. Disputing Sea Control

The ultimate objective for both parties in a naval conflict is to establish sea control. Logically, one force will have to dispute the control at sea if they are not able to establish it.[137] Disputing sea control is simply the opposite of establishing control. The disputing force must try to avoid battles except where they have local superiority and avoid any attempt to establish a blockade. Every opportunity

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[134] Eugenia C Kiesling, ed. *Classics of seapower, Strategic Theories* (Annapolis, MD: United States Naval Institute 1994), 72.

[135] Milan Vego, *Naval Strategy and Operations in Narrow Seas* (London: Frank Cass publishers: 2003), 129–134.

[136] Ibid., 158.

[137] David Jablonsky, ed. *Roots of strategy* (Mechanicsburg: PA., Stackpole Books, 1999), 241.

to contest and threaten sea control must be exploited.[138] The methods to dispute sea control are comprised of fleet in being and minor counter attacks.[139]

A classic example of fleet-in-being is the German battleship Tirpitz who served her entire career as a "fleet in being." Even though she never fired a shot at an enemy ship, her mere presence forced the Allied navies to allocate many warships to defend Arctic convoys. The influence of an established fleet-in-being was summarized by Sir Winston Churchill in a memorandum to the British Chief of Staff Committee in 1942: "The destruction, or even the crippling, of this ship is the greatest event at sea at the present time. No other target is comparable to it. The entire naval situation throughout the world would be altered."[140]

How does a navy know when its operational possibilities are reduced to only disputing control instead of challenging the enemy to establish sea control? Naval theorists give no general answer to that question, but they all discuss the relationship between two opposing forces in a naval operation in terms of "stronger-weaker" or "superior-inferior in strength."

There are no general rules to be applied in order to determine whether one is superior or inferior in strength or whether one is stronger. The answer is embedded in the specific situation. A staff can apply quantitative as well as qualitative tools to determine strength. Ultimately, it is a decision for the commander.

5. Conclusions about Success in Maritime Operations

The possibility of establishing sea control relies on several factors. The most common requirement is superiority in the number of naval ships. The

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[138] United Kingdom Ministry of Defence, Joint Doctrine Publication 0-10, *British Maritime Doctrine*, (Swindon: Ministry of Defence, 2011), 223 § 2-12.

[139] Julian Corbett, *Some Principles of Maritime Strategy* (The Project Gutenberg eBook, February 16 2005), 39

[140] Mark Llewellyn Evans, *Great Word War II Battles in the Artic* (Westport, CT: Greenwood Publishing: 1999), 57.

quantitative strength states that more ships wins over fewer. The modern naval theorist Milan Vego argues that: “the size of a fleet and its force-mix in peacetime are a good indicator as to what probable strategic objectives in a given narrow sea will be pursued in wartime.”[141]

In reality, the United States is the only maritime superpower in the modern world. All other nations must rely upon a local concentration of naval resources or the possibility of concentrating their naval weapons in a certain area of operations, and by that create a local superiority of quantitative strength. Sheer numbers is in itself not enough to explain victory in naval warfare. The ability to optimize the use of available resources is crucial to success.

In order to establish sea control, a naval force must both be large enough to be considered a serious threat, and at same time the available resources must be used in the most efficient way possible. The skill of the navy commander is essential even if his or her force outnumbers the enemy.

Establishing or disputing sea control can be viewed as two sides of the same coin, not as two separate and distinguishable entities. If one side is superior in numbers (of comparable quality in platforms and weaponry), the other must logically be inferior and settle for disputing sea control. The commander’s skill is as equally important in disputing as it is in establishing sea control. The ability to maneuver the fleet to the most favorable situation and to know one’s ship and make the best use of available technology are crucial for success and survival when disputing sea control.

Naval warfare consists of two major components: tactics and technology. The two terms are intertwined and dependent upon each other. Just imagine a naval battle without ships or ships without a crew. This fact distinguishes naval

141 Milan Vego, *Naval Strategy and Operations in Narrow Seas* (London: Frank Cass Publishers, 2003), 108.

operations from ground combat. Hughes states in his book *Fleet Tactics*: “But what is true in ground combat, where machines serve men, is magnified at sea, where men serve machines.”[142]

Success in naval operations is a question not only of numbers and technology, but also the skillset of the crew and the commander and that the ship with crew is appropriately constructed and trained for the specific operation. These requirements are independent of whether one force is superior or the inferior or what kind of operation a naval force is planning to conduct or carrying out.

The decisive point when success is achieved is a relative term and can seldom be pinpointed with absolute accuracy. Eventually, one side will declare success, and it might be at a point when the other side changes its objectives so that operations can terminate without further violence. This point occurs when the decision is made that victory has occurred.[143] The decision must be backed up with evidence, but it is still a decision to declare either victory or defeat. The same principle applies for phased victory, with reference to the phases within an operation. Based on sensor data, subordinate commander reports, and an overall estimation of the situation, the commander makes a decision whether to continue or not.[144] The high tempo in maritime operations and the challenge of fighting in an environment without any possibility to consolidate a victory requires a confident commander, fully able to evaluate and decide if the operation was successful or not. In British tradition, the commander has an outstanding position, which can be illustrated with the following quote from the British

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[142] Wayne, P Hughes Jr., *FLEET TACTICS, Theory and Practice* (Annapolis, MD: U.S. Naval Institute, 1986), 33.

[143] Angelo Codevilla and Paul Seabury, *War Ends & Means* (N.Y: Basic Books inc. Publishers 1989), 243.

[144] United States U.S. Joint Chief of Staff, Joint Publication 3-0, *Joint Operations* (Washington, D.C., 2011) II-4.

Maritime Doctrine: “Once appointed in command, commanding officers in the Royal Navy, regardless of rank, are known as the Captain—and the Captain is the ship.”[145]

The captain decides. Evaluation is focused on the lessons-learned process and can be carried out well after the action has taken place.

C. CONTEMPORARY MARITIME PRINCIPLES APPLIED TO INFORMATION OPERATIONS

1. Contemporary Maritime Principles

The end of the cold war left navies around the world in a vacuum. High seas battles between navies were suddenly reduced in importance and a need to shift focus was apparent. Naval fighting, however, did not come to a full stop. It moved closer to shore and intertwined with actions on land. From this turmoil, an adjusted approach emerged on how to use maritime power in the changed world order. The focus has shifted to littoral warfare and the use of the maritime domain to reinforce other domains and to uphold good order at sea. These changes have opened up interesting adjustments in concepts of operations that might be beneficial to use in an information environment. Geoffrey Till has illustrated the new general concept operations for Navies post-cold war, as shown in Figure 7.

[145] United Kingdom Ministry of Defence, Joint Doctrine Publication 0-10, *British Maritime Doctrine* (Swindon: Ministry of Defence, 2011), 3–8.

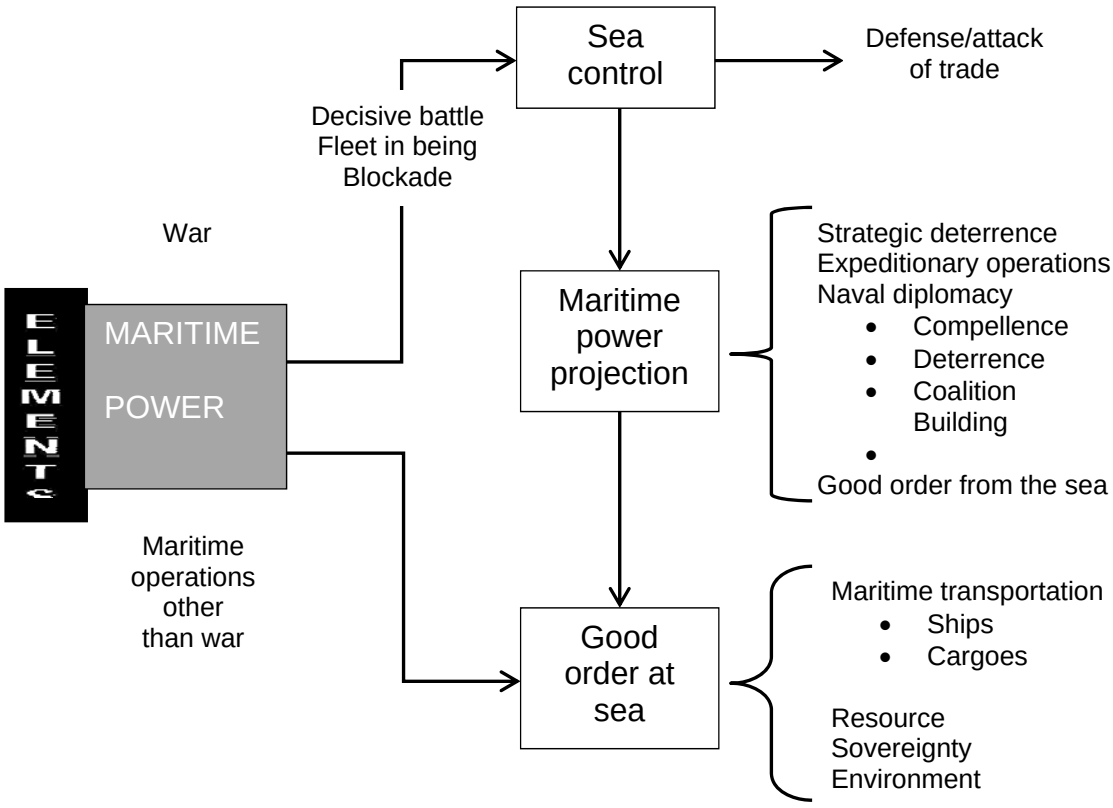

Figure 7. Maritime concept of operation post–Cold War[146]

This new concept is an adaption of the changed political, strategic and geographical conditions that is the framework for a nation's navy. Success in maritime operations is still defined as the ability to use the maritime domain for one's own purposes, or successfully obstructing the enemy from doing so, i.e., establish and maintain sea control. Ships and their armament have not shifted in design overnight, even though there are trends pointing in the direction of smaller ships that are more capable in littoral combat. The development of command and control systems and sensors in all three dimensions, providing the ship with much improved situational awareness, has not changed the commander's unique position as the sole decision-maker. Overall, established attributes for a navy to succeed have not disappeared. What is changed is the way operations will most likely be conducted.

146 From: Geoffrey Till, *Seapower A Guide for the Twenty-First Century* (London: Frank Cass Publishers, 2004), 226.

2. Arena Transformation

War is uncertainty. Even with all the new information technology, satellite surveillance and new sensor technology, it will continue to be uncertain.[147] Battle space dominance is never complete. It is a relative term and all is in the eye of the beholder.[148] It has been so for traditional warfare and it can be anticipated it will be valid for information operations as well. Maritime concepts of operations are solidly based on centuries of naval warfare. One way to simplify information operations planning and execution could be to use the maritime concepts of operations and apply them to the information environment. This would increase the recognition factor and facilitate integration and understanding for those lacking expertise in planning and executing information operations, providing a better understanding of the benefits and challenges to be attained by implementing them.

In terms of how doctrines discuss determination of success, the maritime domain and the information environments deviate from each other. The maritime domain focuses on timely evaluations and the decisions on claiming success or failure are ultimately in the hand of the captain, based on both our own and the adversary's actions. Conversely, the information environment typically relies on post-action evaluation, where the focus is almost entirely on the adversary's reaction. The power assigned to the commander in the maritime domain to decide success or failure is not as prevalent in current information operations doctrines. Instead, evaluation teams carry out the process. According to the Swedish *Doctrine for Information Operations*: "Success is valued by the information operation cell with support of several other sections of the staff."[149]

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147 Angelo Codevilla and Paul Seabury, *War Ends & Means* (New York: Basic Books, 1989), 68.

148 Stuart Albert and Edward C Luck, *On the Endings of Wars* (Port Washington, NY: Kennikat Press Corporation, 1980), 69.

149 Sweden Försvarsmakten, *Handbok Informationsoperationer* (Stockholm, HKV, M7739–352014, 2008) *(Author's translation).*

Transferring maritime concepts of operations should include the transfer of the outstanding position of the commander. This would strengthen the position of and return the ultimate decision of mission accomplished to the information commander. The transfer of arena should also include an application of the maritime concept of operation. Figure 8 shows a first draft of how a modified concept of operations could be applied onto the information environment:

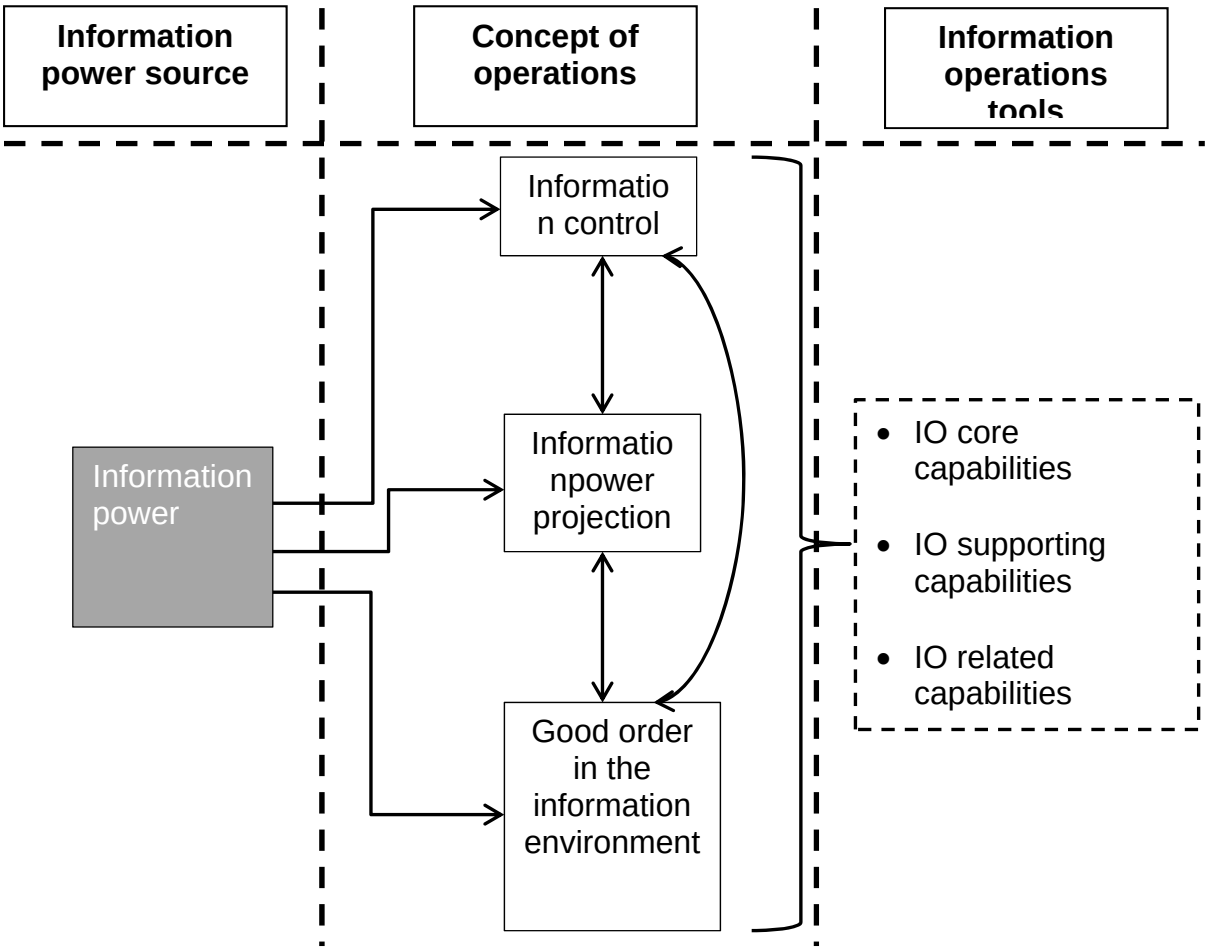

Figure 8. Sketches for information concept of operations

3. General Concept of Information Operations

The “Information Power Source” consists of a commander’s available information resources. Information power can then be applied in one or several of the three general concepts of operations blocks presented in the middle column.

The three main blocks interact with each other and can be applied together or individually. The center column can be interpreted as the Commander's Intent and later on into the planning process as the Mission Statement. The dotted block to the right contains information operations capabilities, described in Table 2. It represents all the tools available in order to achieve the objectives for the information operation.

a. Information Control

In alignment with maritime terminology, information control can be divided into two categories: establishing and disputing information control.

b. Establish Information Control

The goal for information control is to establish rules of engagement for both our own and as well as the adversary's use of a defined information space. Information control differs from information superiority, that aims to establish absolute control: you either have superiority or not; the term control can be graded in order to create realistic and achievable goals for information operations. Note that if a current situation would permit absolute control there would be no difference between superiority and control. The reason to propose a terminology that is less constrained is to address conflict's inherent ambiguous properties, more commonly referred to as the fog of war, friction and chaos.[150] This is especially valid in information operations, where the cognitive domain has a central position, and where responses to influential activities are not always rational or easy to predict. Furthermore, information control is neither offensive nor defensive. It can be carried out for offensive purposes, i.e., when applying military force in a new direction, and it can be applied in defensive operations,

[150] United Kingdom, The Joint Doctrine & Concepts Centre, Joint Doctrine Publictation 01, Second Edition, *Campaigning* (Swindon: Ministry of Defence, 2008), 1–2.

i.e., defending one's own territory. The term control must be, with reference to Till's five factors for sea control, associated with several thresholds before released to the units:

- Who
  - If possible, assign the foreseeable units needed to carry out the task.
  - Pinpoint the core capabilities needed to carry out the task.
- What
  - Narrow down the task.
  - What are the objectives?
  - Apply constraints and restraints.
- When
  - It is necessary to deploy time limits for the operation.
  - It is especially crucial to determine how long information control must remain in place. Information control should not be assigned with the caveat: "until further notice."
  - Where
  - Specify the area of operations. This area can both be a physical as well as an logical area of operation i.e.,
    - Maps showing area of operations.
    - Specify target audiences.
    - Frequency constraints.
    - Media constraints, i.e., which media sources shall remain free from influence and which must be controlled, censored or even silenced.

- Why
    - The purpose of establishing information control must be specified

Establishing information control is accomplished by using a selection of, or all, information resources to both conduct operations inside the information environment as well as influence the other domains from the information environment. The naval requirements to include both concentrations of power as well as tactical and operational skills in order to succeed should as valid when establishing control in the information environment. Electronic warfare is an example of an operation inside the information environment. Military deception is an example of an operation aimed at influencing the overall decision processes of an adversary force.

c. Disputing Information Control

As previously discussed, disputing control is a method used when one side is inferior in force strength and cannot foresee the possibility of establishing control, but still aims to challenge the superior force. Disputing control can be carried out by transmitting radio into areas where the other side claims control or by other means with the aim to challenge the information flow in the area of operations. An example of disputing control is Radio Free Europe, which broadcast news and features to countries behind the Iron Curtain during the Cold War.[151] Another example could be to hack into the adversary's systems and introduce malicious software in their computers and command and control systems, with the aim to aggravate the adversary's command and control capability. The lack of situational awareness due to poor functioning command and control systems can then be exploited by one's own units with informational or kinetic capabilities.

[151] Cissie Dore Hill, "Voices of Hope: The Story of Radio Free Europe and Radio Liberty" October 30, 2001, http://www.hoover.org/publications/hoover-digest/article/6270

d. Information Power Projection

Information power projection aims at using the information environment to influence the other domains. The purpose is to weaken an adversary's decision-making capabilities, to reinforce our own efforts and to create synergetic effects. This can be done by disturbing decision processes, changing behaviors so that the adversary is easier to find, identify, and eliminate. Another objective is to change the attitude of the adversary civilian population and to create a favorable attitude towards our own forces.

e. Good Order in the Information Environment

This is a principle that can be applied over the entire conflict scale. Its objective is to make sure the information environment in the area of operations is functioning properly. This is focused primarily on operations other than war where the knowledge and experience of information operations personnel can be used to establish a free press, reinstall civilian radio stations or by other means establish an information flow in a post-war situation in the area of operations. An important function in a free society is an independent media and it is crucial to establish free press if you want to build peace in a post-conflict area. This can also be construed to be a function of information assurance and cyber defense, where "outlaw" elements that wish to hack into systems and create havoc are deterred or prevented from doing so.

4. Why Use the Proposed Information Concept of Operations

There are two main purposes for application of an already established concept of operations. The first is to benefit from a different process of determining success in information operations. The second is the recognition factor that simplifies understanding of the information environment. Personnel who are not familiar with information operations can better relate to a very complex environment if expressions and a concept of operations are made understandable by borrowing from a familiar domain. Planning is the art of trying to achieve objectives with as little effort as possible. It is always a compromise

between objectives, resources and time available. If the “rookie” user of the information environment can benefit from already existing procedures, they can facilitate the planning process and create a higher acceptance to encompass information operations into the overall operation.

The implementation of a standardized concept of information operations can facilitate the identification and issuance of appropriate objectives for the operation. Using general concepts of operations also facilitates interpretation of received situation reports, sensor data and subordinate commander’s estimates. The general concepts of operation are the structural backbone created to help relate the incoming information to an evaluation of how the operation is proceeding. This would make it easier to timely measure the fulfillment of objectives, and therefore know if success is achieved or not.

In alignment with the outstanding position of a navy commander, the final decision to declare success or failure would be transferred from an evaluation group to the information operations commander, a position every information officer should be trained, prepared and eager to take.[152] This also enables the commander to decide when the situation is satisfying[153] enough to declare mission accomplished instead of waiting for a maximized outcome, which might never occur.[154] Measurements of performance and effectiveness would still be important to evaluate, but not to determine success. Instead, they would serve as the core of a crucial lessons-learned process to continuously improve the capability to carry out successful information operations.

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[152] Clausewitz, *On War,* 102.

[153] Barry Schwartz et. al. “Maximizing Versus Satisficing: Happiness Is a Matter of Choice*”* *Journal of Personality and Social Psychology*, vol. 83, no. 5 (2002): 1178–1197.

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V. FINAL CONCLUSIONS AND FUTURE WORK

A. LOOP BACK TO THE RESEARCH QUESTIONS

- This final chapter will briefly discuss the results of the thesis in correlation with the research question and the added sub-questions, with the aim to make sure that the questions are answered:What is success in military operations?

In order to understand the fundamentals of the research question, the discussion started with analyzing what success is in general warfare. The results of the analysis were then used in the search for the answer of what success is in information operations. The discussion concluded that:

Success in information operations is a favorable level of fulfillment of related objectives on all levels of war, either isolated or orchestrated in combined efforts.

- How is success determined in information operations?

The answer to the question is discussed in section 4.1.2, and the conclusion is that, according to the U.S., British, and Swedish doctrines, success is determined by using post-action evaluation. In the planning process, the objectives and tasks for an information operation are transformed into desired effects. During the evaluation, a desired effect is paired with the performance carried out in order to reach the effect and these two entities are measured. The thesis discusses several challenges connected to this approach and the conclusion is that this process is only capable of providing measures of effectiveness long after the action has occurred.

The literature used does not propose any solutions or standardized processes on how to systematically predict success in information operations, which is concluded to be crucial before engaging with one’s own units. Simply put, without an accurate estimation it is impossible to assign sufficient resources and to use one’s own forces economically and efficiently.

- With regard to the environmental similarities between the maritime and the information environments, can general concepts of naval theory be used when determining success in information operations?

In order to answer the question, the maritime environment and the purpose of naval warfare were analyzed. Based on the results of the analysis, the general concepts of naval operations were transformed and adjusted to fit the information environment. The result was then analyzed with emphasis on why the proposed application could be beneficial when planning and executing information operations.

Even though this study must be viewed as an initial attempt to revise the theoretical approach to information operations, and must be analyzed much more thoroughly before any practical tests, it shows that there can be positive synergetic effects when “borrowing” and using already established procedures from traditional domains. This also provides a final issue to be addressed as to the question of what is success in information operations: if the outcome of an information operation can be determined without time constraints, then the present method is good enough. If the need for timely and even predictive results is prevalent, then there might be a need to adjust current methods.

B. AREAS OF INTEREST AND DIRECTIONS FOR FUTURE STUDIES

The directions for future work have already been mentioned and are repeated here for emphasis:

- Deepened analysis of the present thesis results with the emphasis on studying the effects of implementing a concept of operations from another domain on the information environment.
- Develop an adjusted version of U.S. Joint Publication 3-13, "*Information Operations,*" with a general concept of operations included in the doctrine as presented in the present thesis. Similar adjustments should be made to the British and Swedish doctrinal publications.
- Carry out practical experiments in order to evaluate this new approach in comparison with that now existing.

All of the above suggestions aim at either rejecting or consolidating the findings of this study.

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